

1996 BRISTOL BAY STAFF MEETING MINUTES

October 14-15, 1996
Anchorage Regional Office



Prepared by:
Beverly Cross

Regional Information Report¹ No. 2A97-02

Alaska Department of Fish and Game
Division of Commercial Fisheries Management and Development
333 Raspberry Road
Anchorage, Alaska 99518

January 1997

¹ The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without approval of the author or the Division of Commercial Fisheries Management and Development.

STAFF ASSIGNMENTS
1996 BRISTOL BAY POST SEASON STAFF MEETING

Tim Baker

1. Tim will be available for training and support for MAPINFO. He will check into class offered by Kodiak and see if it is worthwhile for project personnel to attend.

Linda Brannian

1. Calculate variance estimates based on systematic samplings for all three years available for Igushik and Togiak Rivers.
2. Lead author in a report documenting tower analysis, variance estimates. Try to publish as an article in the Alaska Fishery Research Bulletin.
3. Participate in meeting among staff and decide official Department evaluation of 1996 Ugashik smolt counts. Official Department comments should be finalized prior to 11/16/96.

Tom Brookover

1. Schedule a teleconference to discuss Nushagak chinook salmon. Participants should include: Minard, Jaenicke, Hepler or Clark, Brookover, Browning, Cross, Miller, and Brannian. Analysis should be complete in time for April Board of Fish proposals.
2. Work with Keith, Jeff, and Jim to complete PDQ for the new FBII. PDQ should be completed by January 1.
3. Work with other Bristol Bay staff members to hire new FBII. New position should start April 1.
4. Contact Wayne Prigge and check on availability of vacant Fishery Technician III positions. If no vacant FTIII positions then reclass FBI 11-1645 to Fish Tech III.

Jim Browning

1. Work with Keith, Jeff, and Tom to complete PDQ for the new FBII. PDQ should be completed by January 1.
2. Work with other Bristol Bay staff members to hire new FBII. New position should start April 1.

STAFF ASSIGNMENTS
1996 BRISTOL BAY POST SEASON STAFF MEETING (Continued)

Drew Crawford

1. Investigate spring temperatures and/or ice break-up dates for Ugashik in 1985 and 1986. Include information in analysis for reviewing 1996 Ugashik smolt numbers.
2. Investigate historic juvenile information (tow netting) which indicates distribution of juveniles between Upper and Lower Ugashik Lakes.
3. Investigate relationship between fyke net CPUE and smolt counts, was the relationship in 1996 significantly different than past years.
4. Participate in meeting among staff and decide official Department evaluation of 1996 Ugashik smolt counts. Official Department comments should be finalized prior to 11/16/96.
5. Try to coordinate Ugashik smolt deployment closer to lake ice breakup. Enlist volunteer help from permanent employees.

Bev Cross

1. Arrange a meeting among CFM&D, Sport Fish and Subsistence to discuss Wood River escapement goal revision. Need to have internal meeting, subsequently a staff member will present to Nushagak Advisory Committee. Internal review should be completed by Dec 1996.
2. Review Igushik and Togiak escapement goals prior to next Board of Fish meeting. Schedule an internal review, and a staff member will present to local advisory committees.
3. Participate in meeting among staff and decide official Department evaluation of 1996 Ugashik smolt counts. Official Department comments should be finalized prior to 11/16/96.
4. Send out a memo to all Bristol Bay staff members requesting ideas and estimated costs for new projects. Put list together which includes all requests for new projects and send along to regional staff for prioritization.

STAFF ASSIGNMENTS
1996 BRISTOL BAY POST SEASON STAFF MEETING (Continued)

Dennis Haanpaa

1. Check with accounting about documentation of CIP and Cooperative Agreement allocations and expenditures.

Jim Miller

1. Update Project Operational Plan for Nushagak sonar coho extension. Include criteria for deciding which three years to extend counting dates. Be prepared to present criteria at Feb staff meeting.

Jeff Regnart

1. Work with Keith, Tom, and Jim to complete PDQ for the new FBII. PDQ should be completed by January 1.
2. Work with other Bristol Bay staff members to hire new FBII. New position should start April 1.

Keith Weiland

1. Participate in meeting among staff and decide official Department evaluation of 1996 Ugashik smolt counts. Official Department comments should be finalized prior to 11/16/96.
2. Supervise new FBII.
3. Work with Jeff, Tom, and Jim to complete PDQ for the new FBII. PDQ should be completed by January 1.
4. Work with other Bristol Bay staff members to hire new FBII. New position should start April 1.

1996 BRISTOL BAY POST SEASON STAFF MEETING MINUTES

**October 14-15, 1996
Anchorage Regional Office**

October 14, 1996 (1:00 - 4:30 pm)

Attendance: Baker, Brannian, Brookover, Browning, Crawford, Cross, Fried, Haanpaa, Menard, Miller, Regnart, Stratton, Weiland

I. Administration

- A. Appointment of Chairperson - Dennis Haanpaa
- B. Assignment of Recorder - Bev Cross
- C. Agenda Review/Changes

ATTACHMENT 1 provides an outline of the issues and topics discussed during the meeting. Some changes and additions to this outline include:

- III. C. 3. a. "Application of the 1% Rule on the Nushagak River" was added
- III. H. "Wood River Management Plan" was added
- III. F. "Naknek River Management Plan" was deleted
- III. G. "Kvichak River Management Plan" was deleted
- III. H. "Wood River Management Plan" was deleted.

II. Budget

ATTACHMENT 2- Summary of Bristol Bay FY97 budget and FY98 budget requests.

A. FY97 Allocation (Haanpaa)

Everyone has received their FY97 budget allocations. Most general fund budget allocations are less in FY97 compared to FY96. Westside catch sampling has been taken off general funds and coded to test fish funds. Shortages in FY97 funding will have to be solved during pre-audit. The Area does have some vacancy factor which will help solve some deficits.

B. FY98 Request (Haanpaa)

Budget requests for FY98 were increased for most tower projects as a result of staff input. The increases were funded from surplus moneys due to the vacancy of Dennis' position. If Headquarters does not let the Region keep Dennis' vacancy surplus, then deficits will have to be resolved through cuts or switching projects over to test fish.

C. Test Fish (Haanpaa)

Test fish allocations for most projects were increased. Overall increase in Bristol Bay test fish funds from FY96 to FY97 is 18%. Increased program receipts were requested so that if excess money was generated through test fishing the Region would have the ability to spend it. Tom wanted to know what latitude project leaders had in spending test fish allocations. Dennis said that test fish projects should be run similar to the last few years, they should not be expanded to spend the increased program receipts. During pre-audit, Regional staff will decide the amount of test fish revenues required during the 1997 field season. They will also decide any new or additional test fish projects.

Assignment- Dennis will check with accounting about documentation of CIP and Cooperative Agreement allocations and expenditures.

III. Data Analyses and Special Projects

A. Nushagak /Wood River Sockeye (Cross, Miller, Brookover)

1. Escapement Goal Review

ATTACHMENT 3- Summary of Wood River Escapement Goal Review

Tom began the discussion stating that a review of the Wood River sockeye goal was initiated last spring and he had intended to have the revised goal ranges in place for the 1996 fishing season. However, the Nushagak Advisory Committee was concerned that they were not involved in the process. In addition, John Hilsinger wanted to wait until the regular Board of Fish cycle to propose a change in the ranges of the Wood River escapement goal. John also expressed concern over the fact that the Escapement Goal Policy was currently being reviewed and he was unsure how possible changes would affect our review process for Wood River.

Bev passed out Attachment 3 which summarized the major points of the escapement goal review. A meeting was held with the Commercial Fish staff in the spring of 1996 to review the information and there was a consensus that the upper range for Wood River should be increased from 1.2 million to 1.7 million. Subsequently, Bev sent out a memo on April 11 to Sport Fish and Subsistence Divisions which included all the data and results from the analysis. She requested a meeting among the divisions to discuss the information, decided if a change was warranted, and discuss if substantive allocation issues were involved. Soon after she sent out the memo, John Hilsinger decided that the staff needed to slow the process down and involve the public more. Therefore, the review process for Wood River was stopped until after the field season.

During this meeting, Bev and Tom were looking for guidance on how and when to proceed with the review process. Steve Fried suggested that we continue with the process and use the current Escapement Goal Policy as a guideline. His suggestion was based on the fact that he had no idea when a new Escapement Goal Policy would be finalized and thus far he did not see any major changes. Steve suggested that we proceed by organizing a meeting among all the divisions. Subsequently, someone from the staff should present the Department's findings to the interested Advisory Committees. Steve noted that to make revisions to an escapement goal it should probably be presented to the Board of Fisheries, but that a proposal was not necessary unless we were suggested a management plan.

Tom commented that if the Department was going to revise the Wood River escapement goal then the Nushagak Advisory Committee wanted a management plan. Proposals for the next Bristol Bay Board of Fish meeting must be submitted no later than April 15, 1997. Therefore, the Department should present any changes in the goal to the Nushagak Advisory Committee in plenty of time for them to submit a proposal for a management plan if they wanted.

Assignment- Bev Cross distribute another memo concerning the Wood River escapement goal and arrange for a meeting among CFM&D, Sport Fish, and Subsistence Divisions.

B. Nushagak Chinook Escapement Quality (Sport Fish, Brookover, Cross, Miller)

1. Is there a problem
2. Possible Solutions
 - a. Mesh Size Restrictions
 - b. Esc Goal revision

ATTACHMENT 4- Problem Statement Nushagak Chinook Salmon

Sometime in September, Mac Minard had a meeting with CFM&D staff (Steve Fried and Linda Brannian) to discuss the issue of Nushagak chinook escapement quality. During the meeting Mac agreed that Sport Fish would provide staff time to compile and analyze chinook data to get at the question of whether current methods of prosecuting the commercial fishery are having detrimental effects on the quality of chinook escapement into the Nushagak River. Mike Jaenicke from Sport Fish is compiling the information and performing most of the analysis. It had been hoped that a information packet would have been available for this staff meeting. However, delays occurred and Mike just started reviewing the data last week. Bev Cross and Jim Miller have sent Mike total run and age composition information. Mike has distributed a problem statement (Attachment 4) which outlines some of the information he will be reviewing.

ATTACHMENT 5- Nushagak Chinook Catch and Escapement Age Composition

For the past two seasons (1995 and 1996) the Nushagak chinook escapement has been comprised of a high proportion of age-1.1 and age-1.2 fish, while the commercial catch has been comprised of mostly age-1.3 and age-1.4 fish. In addition, there are a higher percent of small fish in the escapement and conversely a higher percent of large fish in the commercial catch early in the season during the directed chinook fishery when large mesh gear is used. Later in the season during the sockeye fishery when small mesh gear is predominant the age and size composition of the escapement increases while the catch size and age composition decreases. The 1995 chinook escapement equaled 85,622, which is approximately 10,000 above the inriver goal. However, of the 85,000 fish escaping into the river only 51,000 were age-1.3 or older. In 1996, only 52,127 chinook salmon escaped the commercial fishery, and of those only 32,939 were large fish (age-1.3, age-1.4, age-1.5).

Concerns have been expressed by staff and from the public about the quality of the chinook escapement into the Nushagak River. The first step is to identify the problem, the extent of the problem, and to look for possible solutions. We have just started this process by sending data to Mike Jaenicke.

Tom said that Sport Fish is interested in submitting a proposal for a mesh size restriction. Consequently, the process of reviewing this issue must be completed in plenty of time to submit a proposal prior to the April 15 deadline.

Tom would like to investigate other solutions than just restricting mesh size, including timing of openings, and longer windows for escapement. Tom has reservations of comparing catch and escapement age compositions from recent years (1992-96) to those from earlier years (1981-86) and subsequently saying the commercial fishery is affecting the escapement quality more now than in the past. Tom does not think we should use age composition from carcass surveys because it does not mean the same thing as scales taken from the sonar project. Bev argued that if scales from carcass surveys are not used then there is no age information for the earlier years. Tom does not believe we can adequately test the hypothesis that escapement quality is worse recently compared to historic years because of limited age information. Therefore, Tom would rather just base our desire to change operations of the commercial fishery on the fact that we think what has transpired the last couple of years is unhealthy.

Dennis suggested that pertinent staff get together and decide what data set was going to be used before Mike Jaenicke did an extensive analysis with data we did not think should be included.

Assignment - Tom Brookover will arrange a teleconference to establish the data set which will be used in the chinook analysis. The teleconference should include: Minard, Jaenicke, Clark, Brookover, Brannian, Cross, Miller, Fried.

C. Tower Analyses (Brannian, Brookover)

ATTACHMENT 6 - Analysis of counting tower precision

1. Determination of Start and Stop Dates

Linda distributed to all the area managers a summary of historic start and stop dates for all the towers, and dates based on the 1% rule. She made some suggestions in her memo. In general, area biologists pulled their towers according to or earlier than the 1% rule.

2. Systematic 10-min Counts vs. Hour Counts

During the 1996 spring Bristol Bay staff meeting, one question that came up was the counting schedule of the towers and ways to reduce costs. There had been discussion of reducing the counting schedule from 10-min counts every hour for 24 hours. Tom Brookover suggested that we have better documentation of the precision of our current counting schedule prior to making any adjustments. Subsequently, Tom, Linda, and Jim Menard designed and implemented a study which included taking some full hour counts at Wood River and comparing them to the 10-min counts.

Jim Menard briefly described how he set up the hour count sampling conducted at Wood River in 1996. In general, they conducted 2 ea. one-hour counts during a 24-hour period. They counted a full hour once during the day and once during the night. When they were going to do a full hour count, they would start counting on the designated bank 20 minutes after the hour. They would count for a full hour, recording the counts after every 10 minutes. That bank's normal 10-min count would be the first 10 minutes they counted. The same bank's normal 10-min count for the next hour would be the last 10 minutes they counted. For example they would start counting on the right bank at 1320. They would count from 1320- 1420 on the right bank recording counts every 10 minutes. The right bank's 1300 10-min count would be counts from 1320-1330. The right bank's 1400 10-minute count would be counts from 1410-1420. The observer would then go to the left bank and count for 10 minutes, and the left bank's 1400 10-min count would usually be the count from 1430-1440. Jim Menard said taking the hour counts did not cost anymore crew time, rather the additional costs incurred were associated with his time to design and administer the project. In 1996, 48 full-hour counts were collected at Wood River.

Linda Brannian passed out some handouts (Attachment 6) which summarized her work analyzing the precision of our tower counts. The first page summarized tower counts, standard errors, and relative errors for Wood, Igushik, and Togiak towers. Linda used two methods to estimate standard errors. The first method which is summarized on page one of her handout, uses the serial nature of the counts and create replicates from adjacent hours counts. Using this method, estimates of relative errors ranged from 4-5% for the total season tower count. Relative errors for daily ranged from 3% to 211%. Linda also included in her handouts the daily counts of Wood River for 1996 which shows how serially correlated counts are through time. Wood River counts in 1996 also showed fish backing downstream during tide reversals.

The second analysis performed by Linda included estimating percent errors of using a 10-minute count and expanding to an hour count compared to the observed full hour counts. Linda built a sample of paired 10-min and hour counts by bootstrapping and sampling with replacement. The first graph showed the relationship of percent errors of the 10-min expanded counts to the number of fish counted during the full-hour count. The percent errors associated with expanded 10-min counts were generally $\pm 100\%$ for fish passage less than 1000 fish-per-hour. The percent error of the expanded counts did seem to decrease as numbers of fish counted during the hour increased. She also showed a graph of percent errors associated with 20-min expanded counts compared to full-hour counts. The percent errors of the 20-min expanded counts were less than the 10-min expanded counts, but were still high ($\pm 80\%$). From this she concluded that a hour count has a great deal of imprecision, and the manager should not based any decisions on a single hour's count. Linda then grouped the data by 4-hr counts because in general that is the smallest time block used for management decisions (tower counts are reported approximately every 4 hours). She handed out a graph of the relationship of 4-hr counts based on 10-min counts versus observed 4-hr counts. The relationship was linear and fairly tight. The next graph showed the percent errors associated with 4-hr counts derived from 10-min counts compared to observed 4-hr counts. The percent errors of the 4-hr counts were $\pm 35\%$. Finally, Linda looked at percent errors of 24-hr counts derived from 10-min counts and found that percent errors were $\pm 15\%$. Linda stated that she thought the standard errors estimated from the full hour counts were probably high because in building her simulated samples hour counts were not correlated in time. Consequently, the errors were probably a maximum because counts are serially correlated and they substantiate each other. She felt that the two analysis were basically telling us the same thing which was that the total season's counts were probably $\pm 5\%$ and the daily counts were $\pm 10-15\%$. To get a better estimate of precision you would have to take full hour counts sequentially, which would cost money in crew time. Linda did not think this was necessary at this point in time.

3. Reduction of Counting Schedule

At this time Linda does not see any further reduction in the tower counting schedules. There is going to be a tower meeting sometime in February, organized by Hal Geiger. The meeting should provide a forum to discuss current counting strategies and possible changes.

ATTACHMENT 7 - One Percent Rule at Nushagak River Sonar

Jim Miller distributed a handout which summarized the effects of applying the 1% rule at Nushagak River sonar. The 1% rule states that after daily escapement counts fall to 1% or less of the cumulative count for three consecutive days then a counting project would be stopped. Attachment 7 summarized the actual last day of counting at Nushagak sonar, the total sockeye counts, the last day counting would have taken place if the 1% rule was applied, and the numbers of fish that would not have been counted. The percentage of fish that would not have been counted if the 1% rule would have been applied varied from 2% to 12% and averaged less than 5%.

Jim Menard discussed other efficiencies that he implemented at the westside towers during the 1996 season. The first thing he did was have everyone write down on their timesheet a 1/2-hour lunch as required by the union contract. It was generally recognized that all the crew was taking at least a 1/2 lunch break sometime during their 8-hr shift, but the 1/2-hr break was not be recorded on the timesheet. By requiring the crews to take and record the lunch break, Jim saved 1.5 hours daily on each tower. Everyone at the meeting agreed to implement this requirement at all the tower, smolt, and test fish projects. Another cost saving procedure Jim implemented was that for towers projects in which the seining was close to the tower, he had two individuals come on at the top of a hour, each person would record a 10-min count on opposites sides of the river, then the two crewmembers would go seine together, until the top of the next hour. At Igushik tower he was able to reduce seining to approximately 1.5 hours.

ATTACHMENT 8 - Results From 1996 Tower Scale Sampling

Bev Cross distributed a summary of the scales taken from the towers in 1996. In general, the sampling went according to plan. Most towers sampled the requested number of scales. Wood, Igushik, and Togiak towers took more samples than requested by 17%, 33%, and 14%, respectively. However, it was a good thing the westside towers took more samples than requested because the rate of unusable scales was higher for westside towers than anticipated. Consequently, the number of usable scales for Wood, Igushik, and Togiak towers was close to that required based on $\pm 5\%$ 90% of the time. Bev said that she will make some minor changes in the tower sampling schemes for the 1997, which will include increasing requested sample sizes for the westside towers.

4. Between Observer Variation

ATTACHMENT 9 - WESTSIDE CALIBRATION COUNTS

Bev Cross distributed a couple of graphs summarizing double counts taken on the westside by Jim Menard and various crewmembers. There really weren't enough double counts to perform a very detailed analysis. To truly estimate differences among observers significantly more double counts will have to be taken, and they will have to be continued through time to take into account training, and include a variety of fish passages. There was a lot of discussion of what benefit increased double counts would provide. The group did not see making any fancy correction models because observers changed too frequently. Linda thought increased double counts could provide some standards for training.

5. Future Work

No future field work was proposed. Tom asked Linda to expand her analysis of standard errors (based on systematic counting) to include the three available years for Igushik and Togiak Rivers.

6. Reporting

Linda agreed to take the lead in preparing a report summarizing her work on tower counting dates and standard errors of the counts. Tom suggested the report be submitted to Bob Wilbur for inclusion in the Alaska Fishery Research Bulletin series.

Assignment- Linda Brannian will calculate variance estimates based on systematic samplings for all three years available for Igushik and Togiak Rivers. She will be lead author in a report documenting tower analysis and variance estimates and try to publish as an article in the Alaska Fishery Research Bulletin.

D. Databases/Maps (Brannian, Baker, Ryznar)

1. Bristol Bay Salmon Database

a. Inseason Catch

Tim Baker summarized the status of the development of the Bristol Bay data base. He said that Bob Ryznar was now working full-time on the Bristol Bay data base. Bob's visit to Bristol Bay this past summer was very helpful, however he will need to work closely with the Bristol Bay staff to clarify data sources, data flow, required output, etc. Tim suggested that all the managers get together and decide the procedure for inputting, editing, and outputting required catch information. Bob plans on putting together a flow diagram of catch, escapement, test fish, and other biological data. The data flow will be sent to the Bristol Bay staff for review and comment. Then Bob will start on the next phase which is the actual coding. The Bristol Bay staff will have to decide on what years will be included in the catch data base and will have to provide edited catches. The catch information is the first priority with the inseason catch reporting being required for 1997.

b. Escapement

c. Other Information

Escapement information is second priority after catch. Most people agreed that the escapement information will be fairly easy to get into a data base.

2. GIS/Maps/MapInfo (Baker)

a. GIS Project - Background

Federal funds became available to the Department last year to develop GIS data bases. Southeast was the first area to develop a GIS data base which was integrated with their IFDIB system. It is to be completed by 1997. The Department decided the next area to develop a GIS system would be Bristol Bay. This decision was based on the fact that we

were currently working on developing a data base with Carmine's shop. It was thought it would be a good time to make sure the data base was "geo-coded" so it could be integrated into a GIS system. Much of what Southeast developed will not transfer directly to Central Region because they are using a mainframe and different software (ARCHVIEW). We are going to use PC computers and MAPINFO.

b. Development of Maps for Central Region

ATTACHMENT 10 - BRISTOL BAY STATISTICAL CODES AND MAPS

Tim has been working with MAPINFO to develop statistical maps for Central Region. He has the coastline of the area at 1:250,000 miles. However, presently he can't distribute the electronic copies because of copyright restrictions. Central Region is going to purchase their own copy of the coastline so they can be distributed. Tim has been putting district and sub-district lines onto the maps as a layer. Subsequently, the district and sub-districts will be turned into polygons. He hopes to have this phase complete by 1997. Tim wanted to make people aware of what he was doing because he possibly could turn out maps we required for upcoming reports or presentations.

c. MapInfo - Support & Training

Assignment - Tim will be available to assist and train staff in the use of MAPINFO. Linda and Tim said MAPINFO was not that difficult to use. Tim also mentioned that a training class in MAPINFO was being offered in Kodiak by Gail (ADF&G employee) in May. Tim was going to find out if it would be worthwhile for staff to attend or the possibility of having her give a class in Anchorage.

3. LAN/WAN

a. Funding, support, upgrades

Jim Browning did an excellent job of getting budget codes from other Divisions to help pay for the Dillingham LAN/WAN. The bad news is that the FY96 encumbrance for the purchase of the Dillingham WAN was released, consequently the charges will have to come out of the FY97 budget.

October 15, 1996 (8:30 am- 3:30 pm)

Attendance: Baker, Brookover, Browning, Crawford, Cross, Fried, Haanpaa, Hilsinger (afternoon), Menard, Miller, Regnart, Weiland

E. Ugashik Smolt 1996 (Crawford)

ATTACHMENT 11 - UGASHIK SMOLT

1. Counts

The 1996 inseason counts at Ugashik River equaled 3.4 million smolt. This compares to the 1983-95 average outmigration estimate of 75.8 million and the 1983-95 minimum count of 22.2 million, which occurred in 1995. Because the 1996 count was so out-of-range low, there was suspicion that the counts were inaccurate. During the season the crew could find no apparent problems. They tested the equipment (transducers) and found them to be operating correctly. In addition, Drew sent in a spare counter which they used as a replacement, but it resulted in similarly low counts. Also, Al Menin checked out the original Ugashik sonar counter after the season and found it to be operating correctly. Drew has analyzed the data to see if anything looked abnormal.

2. Spatial and Temporal Distribution

Approximately, 23% of the sonar counts occurred over the inshore array and 77% occurred over the offshore array in 1996. The lateral distribution on average is 38% over the inshore and 62% over the offshore. However, there has been a wide variation in the spatial distribution of the counts, with the percent inshore ranging from a low of 13% to a high of 82%.

The counts by date in 1996 don't look different compared with the 1987-95 mean counts by date. In 1996, counts were low until May 24 at which time they increased somewhat until June 6 after which counts decreased. During 1996, the distribution of counts throughout the day were similar to those observed in the past. The highest counts occurred from 2400 through 0300.

3. Problems

Overall, Drew did not find any information which indicated that sonar operations were different than past years. The only unusual phenomena were the warm spring and the low river velocity. In 1996, the water velocity was slightly faster than 4 ft/sec, while the average is 6.25 ft/sec. The water velocity in 1996 was similar to that in 1985 and a little faster than the river velocity in 1986. There was some discussion whether the low water level could have resulted in a barrier for smolt migrating out of Upper Ugashik Lake. There is no data to support the presence of a barrier, only a possibility based on the low water velocities.

Assignment- Drew would look into historical ice break-up dates, and weather patterns for Ugashik River to see if 1996 was significantly different than past years. He would also look at historic tow-netting information to try and determine the distribution of juveniles between the upper and lower lakes. Drew agreed to compare fyke net CPUE data with sonar counts for 1996 and past years to see if the relationship was different in 1996.

4. Historical Comparison

The average length and weight of smolt migrating from Ugashik River in 1996 were 101 mm and 9.9 grams for age-1. smolt and 114 mm and 13.5 g for age-2 smolt. The average length and weight of the age-1 smolt were the largest ever observed, while the average length and weight of the age-2 smolt were the seventh largest observed.

5. Funding source(s) and problems

Presently, the funding for Ugashik smolt for 1997 looks good. Monty Norvell AJE approximately \$22,000 from FY96 expenditures back into the Ugashik CIP because there was excess money in 1996. Consequently, we have another year of full support for Ugashik smolt. Any money from Lake and Peninsula Borough or Pilot Point will be used for the 1998 season.

Assignment- Drew will organize a meeting among staff (Steve Fried, Linda Brannian, Bev Cross, and Keith Weiland) to review any additional information he analyzes, and to decide on an official Department interpretation of the 1996 Ugashik smolt counts.

Assignment- Drew will try to coordinate Ugashik River smolt deployment closer to ice breakup. Enlist volunteer help from permanent staff.

F. Naknek River Management Plan (Regnart, Hepler)

Sport Fish not available to attend the meeting, no discussion.

G. Kvichak River Management

1. Triggers to restrict subsist and/or sport fishing (Hepler)

Sport Fish not available to attend the meeting, no discussion.

IV. Personnel

A. New FBII

1. Funding

There is funding in the FY97 budget for 12 mm of FBII time (16C) at Anchorage scale. There is also a request in for FY98 for 12 mm of FBII time. In addition, there is 2 mm of FBII funding for a Westside camp coordinator in the FY97 budget and the FY98 request. In addition, there is 11 mm funding in the Stock ID test fish budget for Jim Menard.

Therefore, Jim Menard could continue to be the Westside field camp coordinator, or he could go back to research full-time, because the budget would support both options.

2. Supervision

Supervision was discussed after the group talked about responsibilities and duty station. There was some discussion of having two people supervise the position, however most people agreed that having one supervisor is less confusing. During the field season, the incumbent will probably be taking instructions from several different people depending on what fishery he/she is assisting. Keith Weiland volunteered to supervise the new FBII. Dennis Haanpaa agreed to Keith's suggestion and told Keith he needed to work with Tom, Jim, Jeff, and Bev and get a PDQ down to Juneau by January 1. The goal is to have the person begin working April 1, 1997.

Assignment- Keith work with Jeff, Tom, Jim, and Bev to complete a PDQ for the new FBII position and submit to Juneau prior to January 1, 1997. The goal is to have the person start working on April 1, 1997.

3. Duty Location

The position is budgeted for 12 mm as a 16C, Anchorage scale. The position will spend approximately 5 months in Bristol Bay and 7 months in Anchorage. The duty station will be Anchorage.

4. Responsibilities

ATTACHMENT 12 - OUTLINE FBII RESPONSIBILITIES PER REGNART MEMO 04/14/96

There was substantial discussion on the duties and responsibilities of the new FBII position. Jeff Regnart emphasized that the number one priority of the position was to train a well-rounded knowledgeable management biologist who could take over any position in Bristol Bay. Keith agreed that the first year or two the highest priority for the position was to get the incumbent familiar with Bristol Bay and competent to take on a variety of management duties. Tom thought overall training was important, but he was also interested in having a position which would assume the overall supervision of the tower projects. Someone who would analyze the data, report the information, and design new procedures when needed. Bev expressed the concern that the position should be given something that is chiefly their responsibility, otherwise the person will never feel like they have something of their own. Steve voiced concerned that we needed to assign the position some specific responsibilities, otherwise the position will be hard to justify simply as a training experience. Bev and Steve thought the position should have some kind of EO authority, otherwise how would they get management experience. Jeff felt strongly that the position needed to be trained in all facets of Bristol Bay and not be locked into specific projects.

The responsibilities outlined in Regnart's memo (04/14/96) have the FBII involved in the most active fisheries through time. The person would be in Dillingham from April 1 through May 15 helping with the herring fishery. From May 16 through June 10, the incumbent would be in King Salmon setting up the office and getting ready for the field season and then from June 11 through June 30 she/he would be in Dillingham assisting with the chinook fishery and westside tower supervision. The incumbent would return to King Salmon from July 1 through July 15 and assist with management activities for the eastside districts. For the rest of the summer, July 16 through September 15, the person would divide their time between Dillingham and King Salmon assisting with spawning ground surveys, public assistance, sampling, and post-season compound duties. Jeff's memo had the person stationed in Dillingham for the remainder of the year, however the decision was made to station the position in Anchorage therefore from September 16 through March 30 the person would be in Anchorage.

There was a lot of discussion concerning the merits of having the FBII completely free of all project responsibilities which would enable him/her to experience the full spectrum of the Bay's fisheries, or conversely have them tied to specific projects. In general, Keith and Jeff favored having the FBII work throughout the Bay, while Tom was concerned that someone assume overall responsibility of the tower projects. Bev and Steve thought the FBII position should provide training the first couple of years, but that there should be some vision for the future and what projects or specific responsibilities they would ultimately assumed. Steve made the comment that if the position is merely a training slot, than perhaps we should have kept the Regional FBIV position who would be cross-trained throughout the region and could provide backup support during vacancies.

John Hilsinger attended the meeting during the afternoon and listened to a review of the comments that had been expressed about staffing. His suggestion was that the FBII position emphasize training and getting in-depth experience in all aspects of Bristol Bay fisheries. His goal for the position was to develop a well-rounded biologist who could step into any vacated management or research position. However, he felt the incumbent could gain experience throughout the Bay and still provide overall supervision to a project or fishery. His suggestion was to have the FBII position provide general supervision to all the tower projects which included supervising the west and eastside field camp coordinators. The FBII would be responsible for developing, operating, analyzing data, and reporting on the tower projects. It was decided that the FBII position would supervise the towers and assist the other managers throughout the season. A tentative schedule would include involvement in the herring fishery during April and May, dividing her/his time between King Salmon and Dillingham during salmon season and for spawning ground surveys, and being in Anchorage from September 16 through March 31. Keith would finalize a PDQ and submit to Anchorage.

5. Reports

B. Westside Field Camp Coordinator

1. Duration
2. Employee

Bev and Jim Menard expressed the desire for Jim Menard to return full-time to research. He would help out with Ugashik smolt, Igushik and Egegik test fish, and catch sampling. He would become primary author for the C&E, and assist with test fish and smolt reports. In general the staff agreed with this, although Tom was worried about the lack of continuity within the westside tower projects and the lack of experience among his staff.

Tom says the Westside needs a field camp coordinator for a longer duration than 2 months. A two-month field camp coordinator can get the camps set up, take care of operations during the season, and help dismantle at the end of the season. However, with only 2 mm of time, the field camp coordinator cannot do any data analysis, write reports, or help design new procedures. If we are going to only fund the field camp coordinator for 2 months, then the job should be classified as a FTIII, not a FBI. If the Dillingham position is downgraded to a FTIII, then the budget would almost cover 3 months of time. Reporting for the tower operations, designing new procedures and overall supervision of the towers could be the responsibility of the new FBII.

It was agreed that Jim Menard would return to assisting with research projects during the summer, and that the westside field camp coordinator would be hired at the FTIII level for approximately 3 months.

Assignment- Tom contact Wayne Prigge and check on the availability of a vacant Fishery Technician III position. If no vacant FTIII's then reclass FBI 11-1645 to a FTIII.

V. Reports

A. AMR

1. Tables and Appendix Tables review (Browning)

Jim Browning had some suggestions about possibly deleting some tables from the AMR. Dennis suggested that Jim make copies of any tables he thought should be deleted and distribute them to participating staff for their comments. Dennis said he had no problem with making the AMR more succinct but he wanted to make sure that tables that were being used by people were not deleted.

2. Overlap of AMR and C&E reports

There are numerous tables duplicated in the AMR and the C&E. Bev brought up the fact that Linda Brannian had reviewed the C&E and make a list of all the duplicated tables. Linda had suggested deleting most of the duplicated tables from the C&E. It was agreed that the tables summarizing catch and escapement numbers by date would be deleted from the C&E. The C&E would just include the detailed tables of age, sex, length and weight information by period for the catch and escapement. The C&E would also include the brood tables, conversely the brood tables would be deleted from the AMR.

VI. BOF Agenda Change Requests

1. Review of any agenda change requests for Bristol Bay

The region's comments to the agenda change requests (ACR) were sent to Larson on 10/14. John, Dennis, Jeff, and Keith will attend the Board of Fish meeting in Wasilla during which they will review agenda change requests.

VII. Miscellaneous

Jim Browning is the editor for the 1996 AMR. He has requested that staff send him their materials for inclusion in the AMR by November 15, 1996.

The spring Bristol Bay staff meeting is scheduled for February 26-26, 1997. Assignment- Jim Miller will revise the Project Operational Plan for the extension of coho counting in the Nushagak River and present the revisions at the spring staff meeting. The revisions should include criteria for choosing the three years which we want to extend counting through September 15 (i.e. timing and abundance).

Other issues which should be included on the agenda for the spring meeting include: 1) Department proposals for the 1997 BOF meeting which are due April 15; 2) the issue of waste of salmon, pink salmon during the coho fishery; 3) incorrect catch reporting.

Assignment- Bev will review the Igushik and Togiak escapement goals prior to the next Board of Fish meeting. She will schedule internal review and staff members will present to local advisory committees.

Assignment- Bev will send out a memo to all Bristol Bay staff requesting ideas and estimated cost for new projects. She will synthesize the requests for new projects and send along to regional staff for prioritization.

BRISTOL BAY POST SEASON STAFF MEETING

**October 14-15, 1996
Anchorage ADF&G Office
8:30 a.m. New Conference Room**

AGENDA

I. Administration

- A. Appointment of Chairperson
- B. Assignment of Recorder
- C. Agenda Review/Changes

II. Budget

- A. FY97 Allocation (Haanpaa)
- B. FY98 Request (Haanpaa)
- C. Test Fish

III. Data Analyses and Special Projects

- A. Nushagak /Wood River Sockeye (Cross, Miller, Brookover)
 - 1. Escapement Goal Review
- B. Nushagak Chinook Escapement Quality (Sport Fish, Brookover, Cross, Miller)
 - 1. Is there a problem
 - 2. Possible Solutions
 - a. Mesh Size Restrictions
 - b. Esc Goal revision
- C. Tower Analyses (Brannian, Brookover)
 - 1. Determination of Start and Stop Dates
 - 2. Systematic 10-min Counts vs. Hour Counts
 - 3. Reduction of Counting Schedule
 - 4. Between Observer Variation
 - 5. Future Work
 - 6. Reporting

BRISTOL BAY POST SEASON STAFF MEETING

**October 14-15, 1996
Anchorage ADF&G Office
8:30 a.m. New Conference Room**

AGENDA

III. Data Analyses and Special Projects

D. Databases/Maps (Brannian, Baker, Ryznar)

1. Bristol Bay Salmon Database
 - a. Inseason Catch
 - b. Escapement
 - c. Other Information
2. GIS/Maps/MapInfo (Baker)
 - a. GIS Project - Background
 - b. Development of Maps for Central Region
 - c. MapInfo - Support & Training Data Base
GIS (Brannian)
3. LAN/WAN
 - a. Funding, support, upgrades

E. Ugashik Smolt 1996 (Crawford)

1. Counts
2. Spatial and Temporal Distribution
3. Problems
4. Historical Comparison
5. Funding source(s) and problems

F. Naknek River Management Plan (Regnart, Hepler)

G. Kvichak River Management

1. Triggers to restrict subsist and/or sport fishing (Hepler)

IV. Personnel

A. New FBII

1. Funding
2. Supervision
3. Duty Location
4. Responsibilities
5. Reports

BRISTOL BAY POST SEASON STAFF MEETING

**October 14-15, 1996
Anchorage ADF&G Office
8:30 a.m. New Conference Room**

AGENDA

B. Westside Field Camp Coordinator

1. Duration
2. Employee

V. Reports

A. AMR

1. Tables and Appendix Tables review
2. Overlap of AMR and C&E reports

VI. BOF Agenda Change Requests

1. Review of any agenda change requests for Bristol Bay

DISTRIBUTION:

Baker
Brannian
Brookover
Browning
Clark
Crawford

Cross
Fall
Fried
Haanpaa
Hepler
Hilsinger

Menard
Miller
Minard
Regnart
Rowell
Weiland

McBride

BRISTOL BAY POST SEASON STAFF MEETING

**October 14-15, 1996
Anchorage ADF&G Office
8:30 a.m. New Conference Room**

AGENDA

I. Administration

- A. Appointment of Chairperson
- B. Assignment of Recorder
- C. Agenda Review/Changes

II. Budget

- A. FY97 Allocation (Haanpaa)
- B. FY98 Request (Haanpaa)
- C. Test Fish

III. Data Analyses and Special Projects

- A. Nushagak /Wood River Sockeye (Cross, Miller, Brookover)
 - 1. Escapement Goal Review
- B. Nushagak Chinook Escapement Quality (Sport Fish, Brookover, Cross, Miller)
 - 1. Is there a problem
 - 2. Possible Solutions
 - a. Mesh Size Restrictions
 - b. Esc Goal revision
- C. Tower Analyses (Brannian, Brookover)
 - 1. Determination of Start and Stop Dates
 - 2. Systematic 10-min Counts vs. Hour Counts
 - 3. Reduction of Counting Schedule
 - 4. Between Observer Variation
 - 5. Future Work
 - 6. Reporting

BRISTOL BAY POST SEASON STAFF MEETING

**October 14-15, 1996
Anchorage ADF&G Office
8:30 a.m. New Conference Room**

AGENDA

III. Data Analyses and Special Projects

D. Databases/Maps (Brannian, Baker, Ryznar)

1. Bristol Bay Salmon Database
 - a. Inseason Catch
 - b. Escapement
 - c. Other Information
2. GIS/Maps/MapInfo (Baker)
 - a. GIS Project - Background
 - b. Development of Maps for Central Region
 - c. MapInfo - Support & Training Data Base
GIS (Brannian)
3. LAN/WAN
 - a. Funding, support, upgrades

E. Ugashik Smolt 1996 (Crawford)

1. Counts
2. Spatial and Temporal Distribution
3. Problems
4. Historical Comparison
5. Funding source(s) and problems

F. Naknek River Management Plan (Regnart, Hepler)

G. Kvichak River Management

1. Triggers to restrict subsist and/or sport fishing (Hepler)

IV. Personnel

A. New FBII

1. Funding
2. Supervision
3. Duty Location
4. Responsibilities
5. Reports

BRISTOL BAY POST SEASON STAFF MEETING

**October 14-15, 1996
Anchorage ADF&G Office
8:30 a.m. New Conference Room**

AGENDA

B. Westside Field Camp Coordinator

1. Duration
2. Employee

V. Reports

A. AMR

1. Tables and Appendix Tables review
2. Overlap of AMR and C&E reports

VI. BOF Agenda Change Requests

1. Review of any agenda change requests for Bristol Bay

DISTRIBUTION:

Baker
Brannian
Brookover
Browning
Clark
Crawford

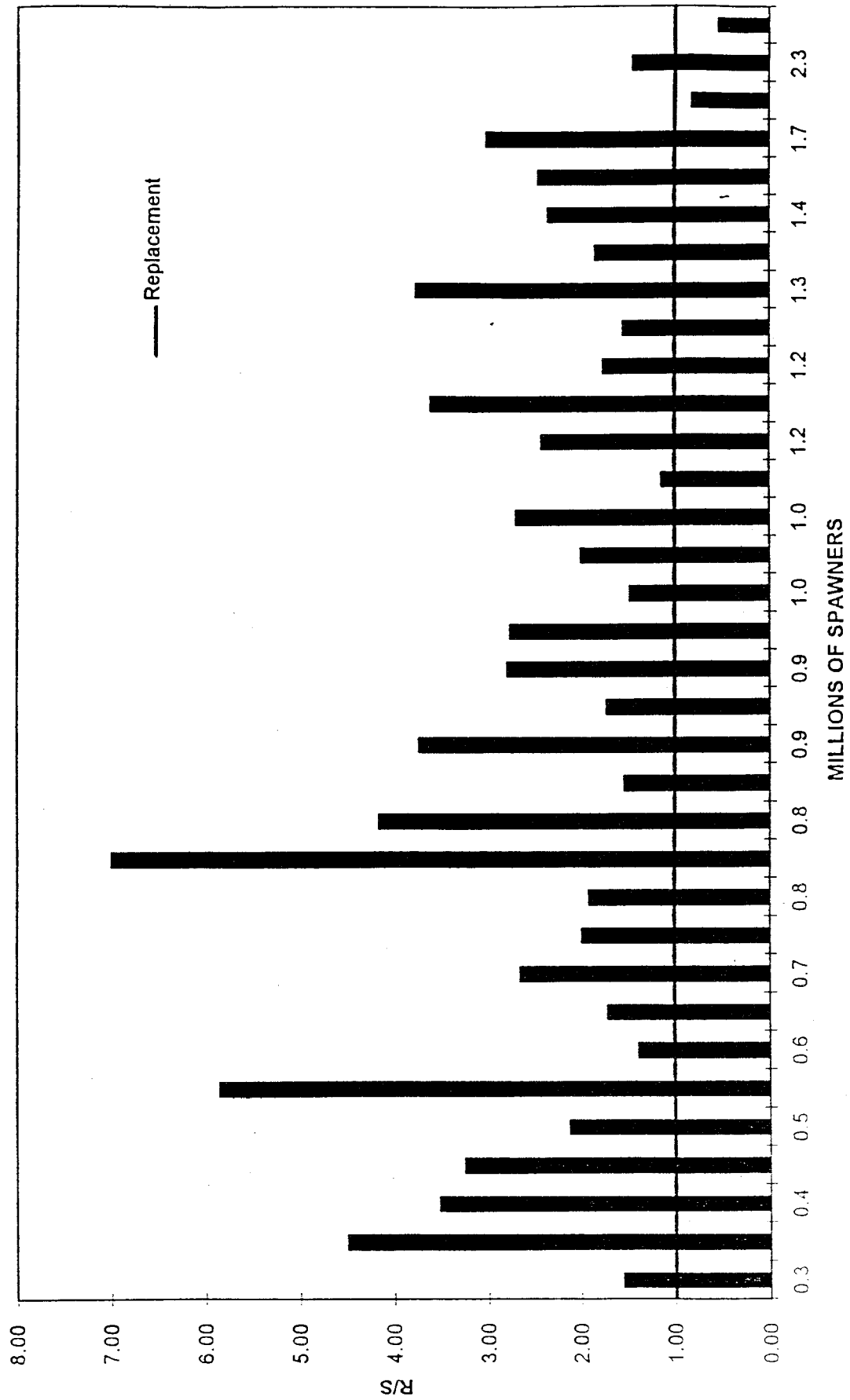
Cross
Fall
Fried
Haanpaa
Hepler
Hilsinger

Menard
Miller
Minard
Regnart
Rowell
Weiland

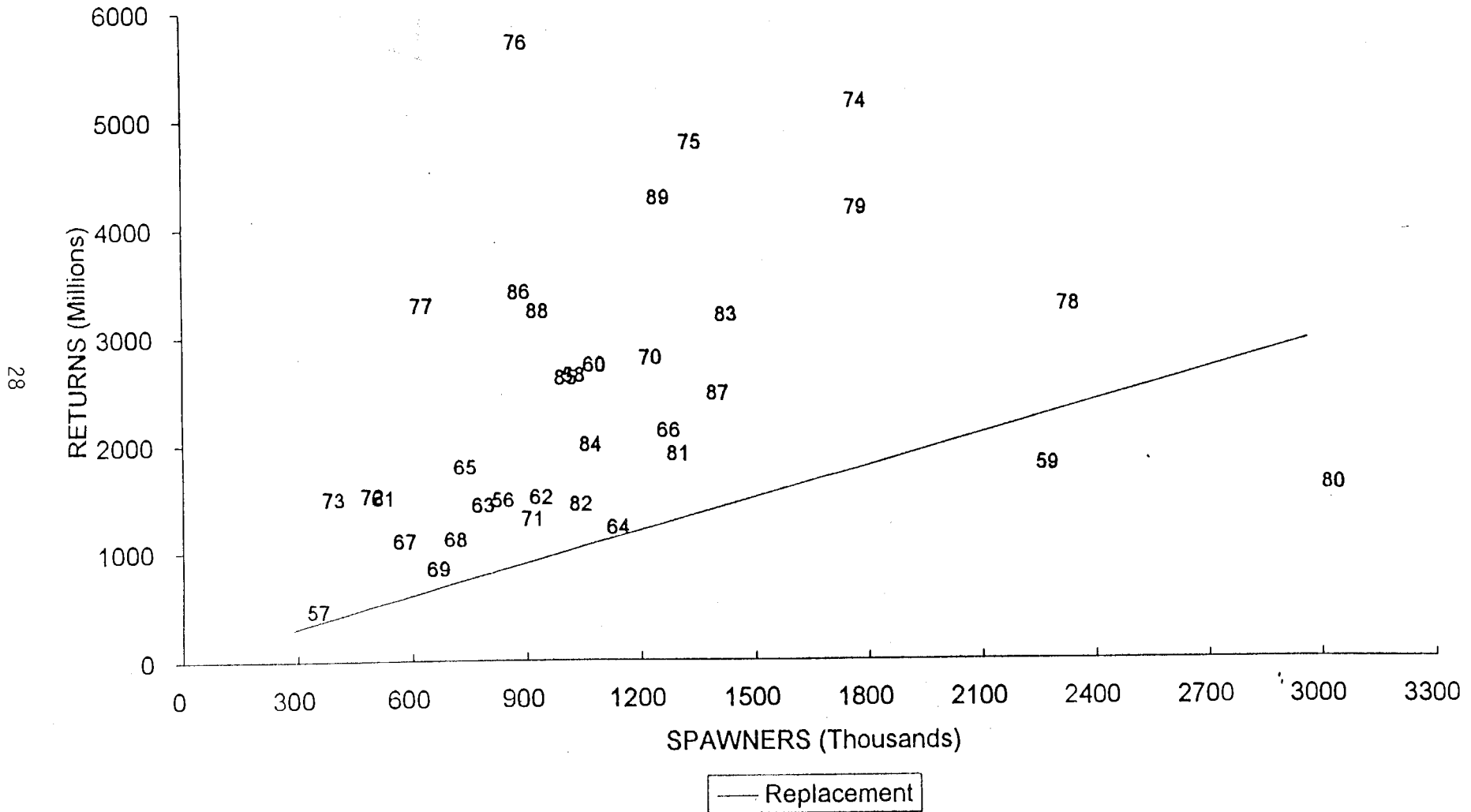
McBride

BRISTOL BAY SALMON										FY'98	FY'97	FY'96	FY'95	FY'94	94-96 AVE.
FISHERY UNIT	PROJECT		100P	100S	200	300	400	500	TOTAL						
FM-400	PROG. MGMT. EAST	FY97	\$183.5	\$5.8	\$14.3	\$36.1	\$13.6	\$0.0	\$253.3		\$253.3	\$275.5	\$291.6	\$216.8	\$261.3
		FY98	\$183.5	\$9.4	\$16.8	\$40.6	\$14.7	\$0.0	\$265.0	\$265.0					
FM-401	FISH. MONIT. EAST	FY97		\$49.6	\$1.0	\$28.6	\$0.5	\$0.0	\$79.7		\$79.7	\$92.8	\$92.2	\$78.9	\$88.0
		FY98		\$54.6	\$2.3	\$23.8	\$4.9	\$0.0	\$85.6	\$85.0					
FM-402	KVICHAK TOWER	FY97		\$27.0	\$0.6	\$8.9	\$2.9	\$0.0	\$39.4		\$39.4	\$46.6	\$36.3	\$40.0	\$41.0
		FY98		\$32.2	\$0.4	\$5.0	\$3.4	\$0.0	\$39.0	\$39.0					
FM-403	NAKNEK TOWER	FY97		\$24.9	\$0.0	\$5.1	\$2.6	\$0.0	\$32.6		\$32.6	\$35.9	\$33.3	\$35.4	\$34.9
		FY98		\$24.9	\$0.0	\$4.2	\$2.6	\$0.0	\$31.7	\$31.7					
FM-404	EGEGIK TOWER	FY97		\$22.5	\$0.0	\$5.0	\$3.2	\$0.0	\$30.7		\$30.7	\$35.4	\$33.5	\$37.4	\$35.4
		FY98		\$25.2	\$0.0	\$4.2	\$2.5	\$0.0	\$32.2	\$32.2					
FM-405	UGASHIK TOWER	FY97		\$21.4	\$0.0	\$7.1	\$2.1	\$0.0	\$30.6		\$30.6	\$31.3	\$26.3	\$30.3	\$29.3
		FY98		\$21.1	\$0.0	\$5.9	\$2.1	\$0.0	\$30.1	\$30.1					
FM-406	KVICHAK SMOLT	FY97		\$32.8	\$0.0	\$7.3	\$3.2	\$0.0	\$43.3		\$43.3	\$39.8	\$35.3	\$45.1	\$40.1
		FY98		\$32.8	\$0.0	\$7.3	\$3.2	\$0.0	\$43.3	\$43.3					
FM-407	EGEGIK SMOLT	FY97		\$30.9	\$0.0	\$6.5	\$3.8	\$0.0	\$41.2		\$41.2	\$47.1	\$27.8	\$43.7	\$39.5
		FY98		\$30.9	\$0.0	\$5.5	\$3.8	\$0.0	\$41.2	\$41.2					
FM-408	BB RESEARCH	FY97	\$195.8	\$0.0	\$7.6	\$6.0	\$3.0	\$0.0	\$212.4		\$212.4	\$202.9	\$160.4	\$241.4	\$201.6
		FY98	\$195.8	\$0.0	\$11.6	\$2.5	\$2.5	\$0.0	\$212.4	\$212.4					
FM-409	PROG.MGMT. WEST	FY97	\$273.9		\$3.7	\$63.4	\$8.0	\$0.0	\$349.0		\$349.0	\$360.7	\$307.2	\$316.9	\$328.3
		FY98	\$273.9		\$3.7	\$63.4	\$8.0	\$0.0	\$349.0	\$349.0					
FM-410	FISH. MONIT. WEST	FY97		\$30.7	\$0.0	\$12.0	\$2.5	\$0.0	\$45.2		\$45.2	\$74.3	\$59.3	\$38.2	\$57.3
		FY98		\$37.0	\$0.2	\$16.0	\$2.5	\$0.0	\$55.7	\$55.7					
FM-411	CATCH SAMP. WEST	FY97		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
		FY98		\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0					
FM-412	WOOD R. TOWER	FY97		\$18.7	\$0.2	\$1.6	\$2.6	\$0.0	\$23.1		\$23.1	\$27.9	\$31.4	\$21.2	\$26.8
		FY98		\$23.0	\$0.2	\$0.5	\$3.2	\$0.0	\$27.3	\$27.3					
FM-413	NUSH. SONAR	FY97		\$46.3	\$1.5	\$4.5	\$5.2	\$0.0	\$57.5		\$57.5	\$62.9	\$52.1	\$59.0	\$58.0
		FY98		\$49.6	\$1.5	\$4.5	\$5.2	\$0.0	\$60.8	\$60.8					
FM-414	NUSH. SONAR COHO	FY97		\$17.7	\$0.7	\$0.0	\$2.2	\$0.0	\$20.6		\$20.6	\$20.2	\$23.6	\$20.9	\$21.6
		FY98		\$17.7	\$0.7	\$0.0	\$2.2	\$0.0	\$20.6	\$20.6					
FM-415	IGUSHIK TOWER	FY97		\$20.0	\$0.0	\$1.2	\$1.6	\$0.0	\$22.8		\$22.8	\$29.0	\$34.2	\$28.3	\$30.5
		FY98		\$26.4	\$0.0	\$2.0	\$2.1	\$0.0	\$30.5	\$30.5					
FM-416	TOGIAK TOWER	FY97		\$22.6	\$0.0	\$2.0	\$1.5	\$0.0	\$26.1		\$26.1	\$34.5	\$33.3	\$29.3	\$32.4
		FY98		\$26.6	\$1.2	\$1.0	\$2.0	\$0.0	\$31.7	\$31.7					
GENERAL FUND TOTALS										\$1,355.5	\$1,307.5	\$1,416.8	\$1,277.8	\$1,282.8	\$1,325.8

WOOD RIVER SOCKEYE RETURNS-PER-SPAWNER

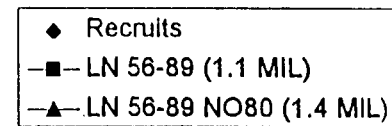
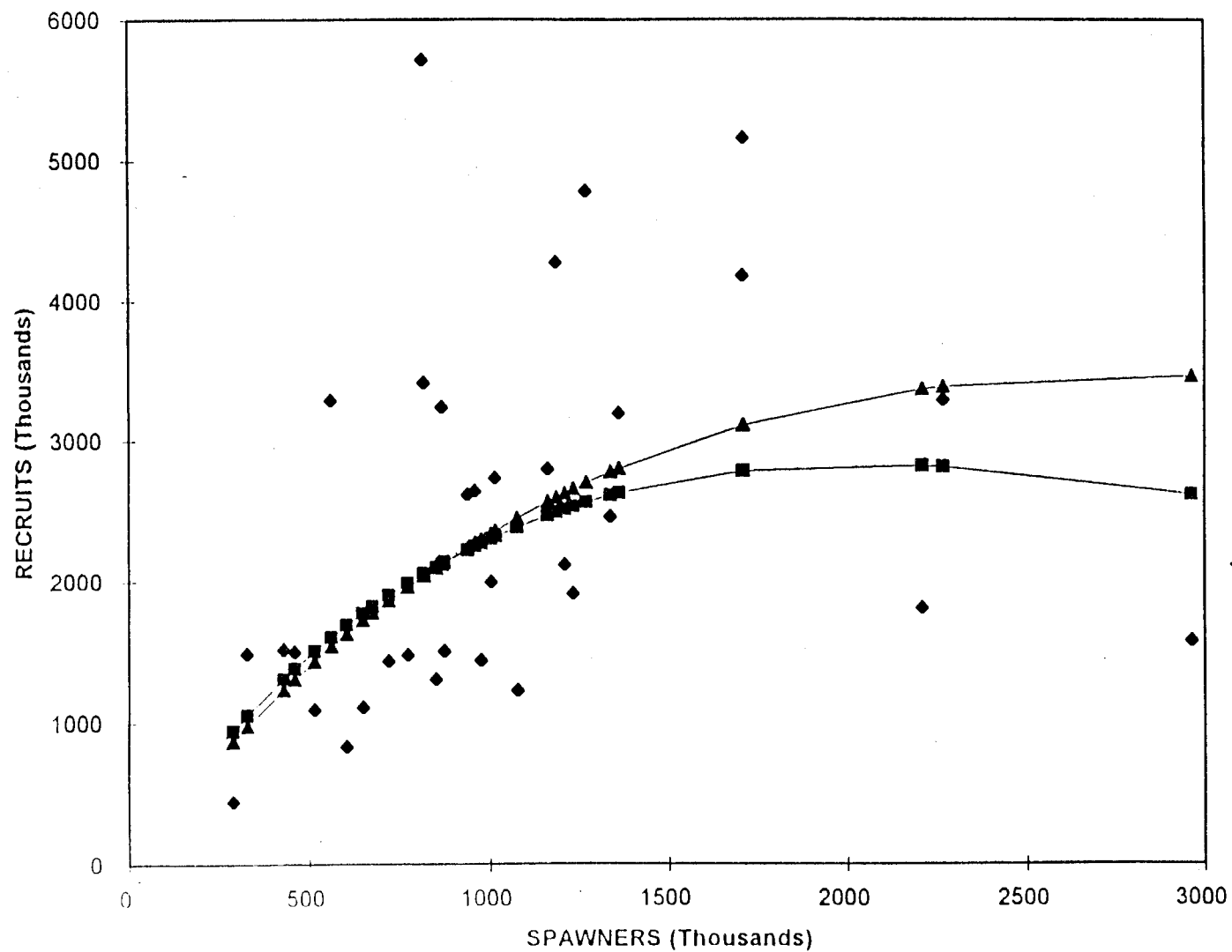


WOOD RIVER SOCKEYE SALMON SPAWNER-RETURNS 1956-89

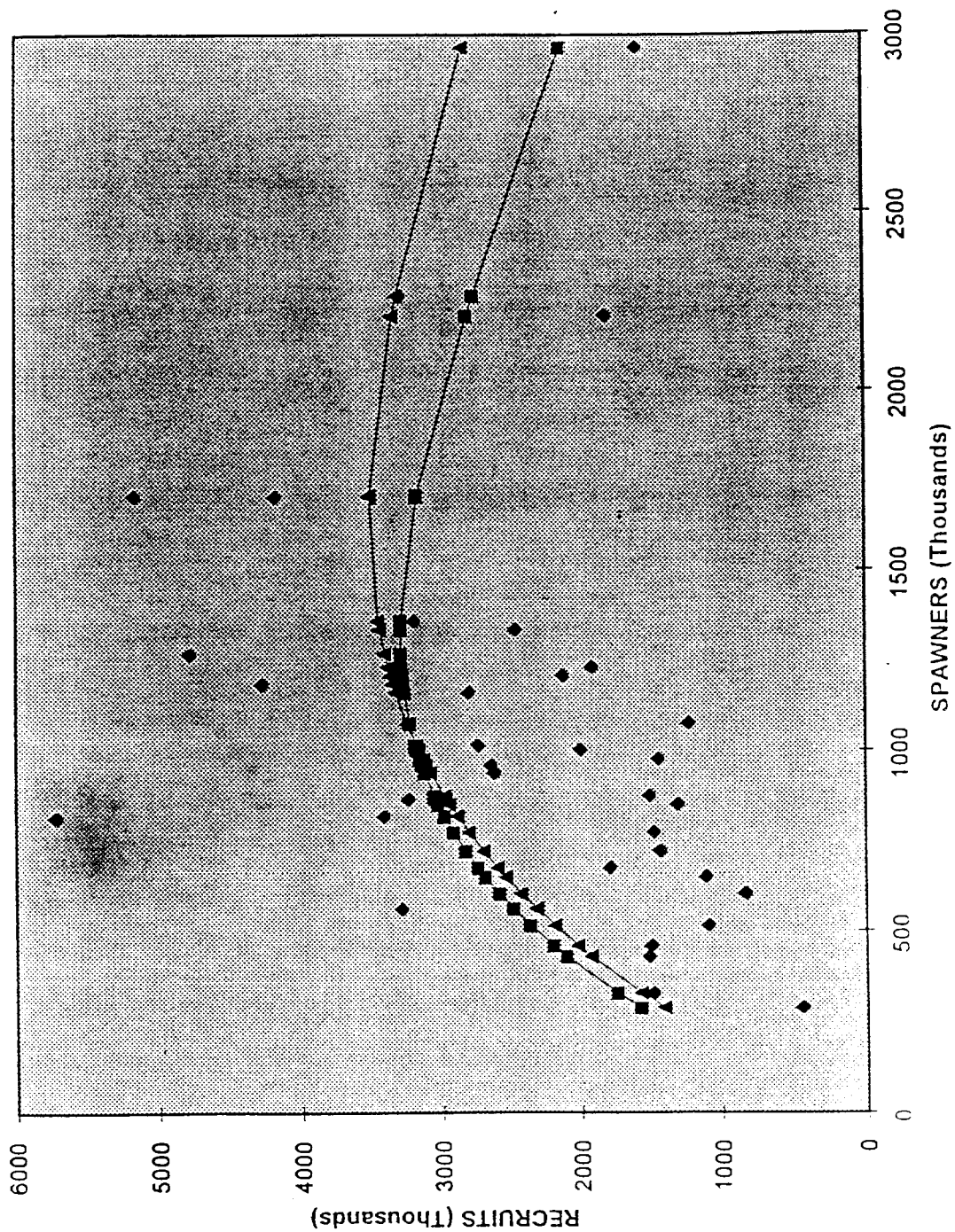


WOOD RIVER SOCKEYE SALMON

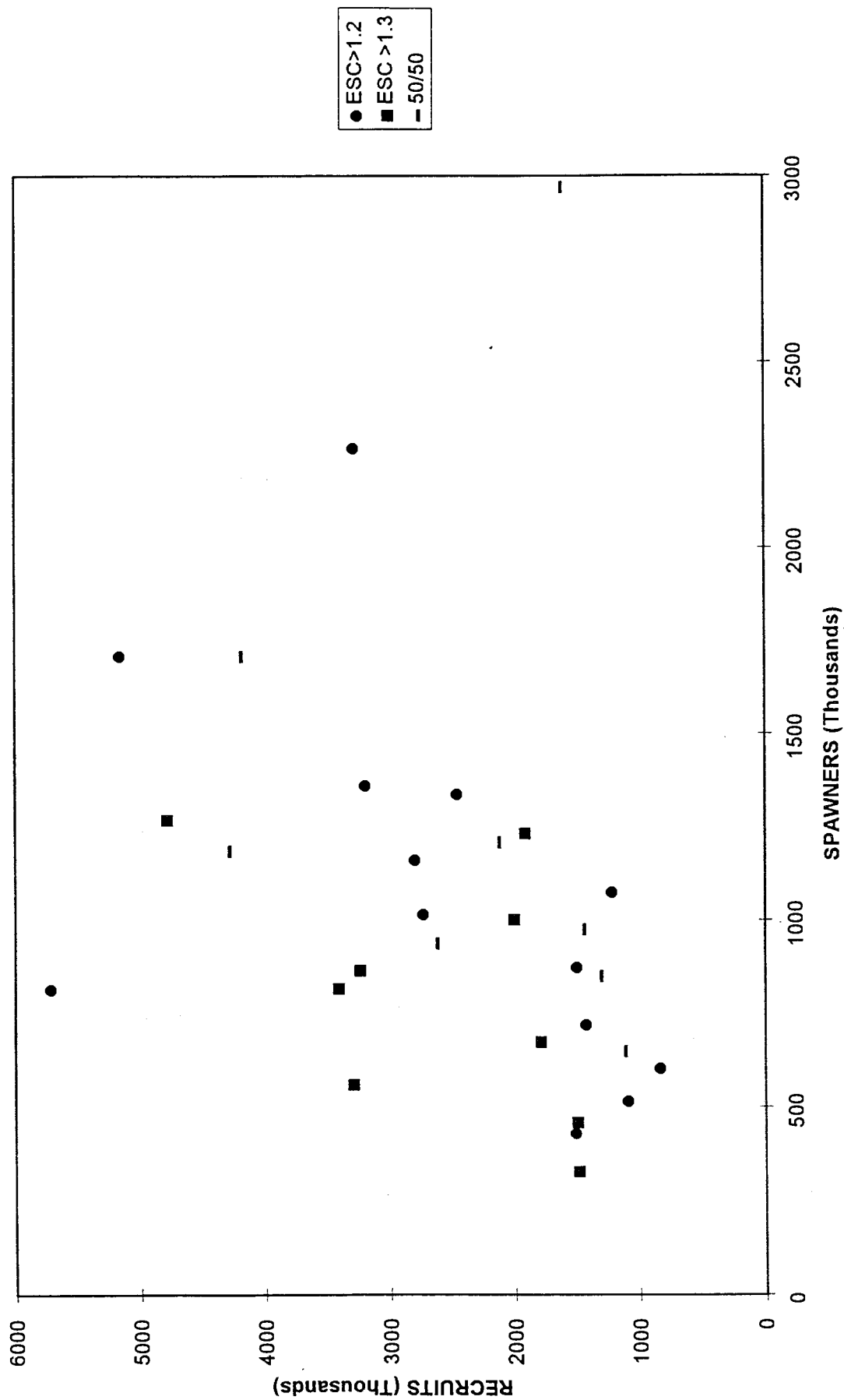
SPAWNER-RECRUITS 1956-89



WOOD RIVER SOCKEYE SALMON SPAWNER-RECRUITS 1973-89

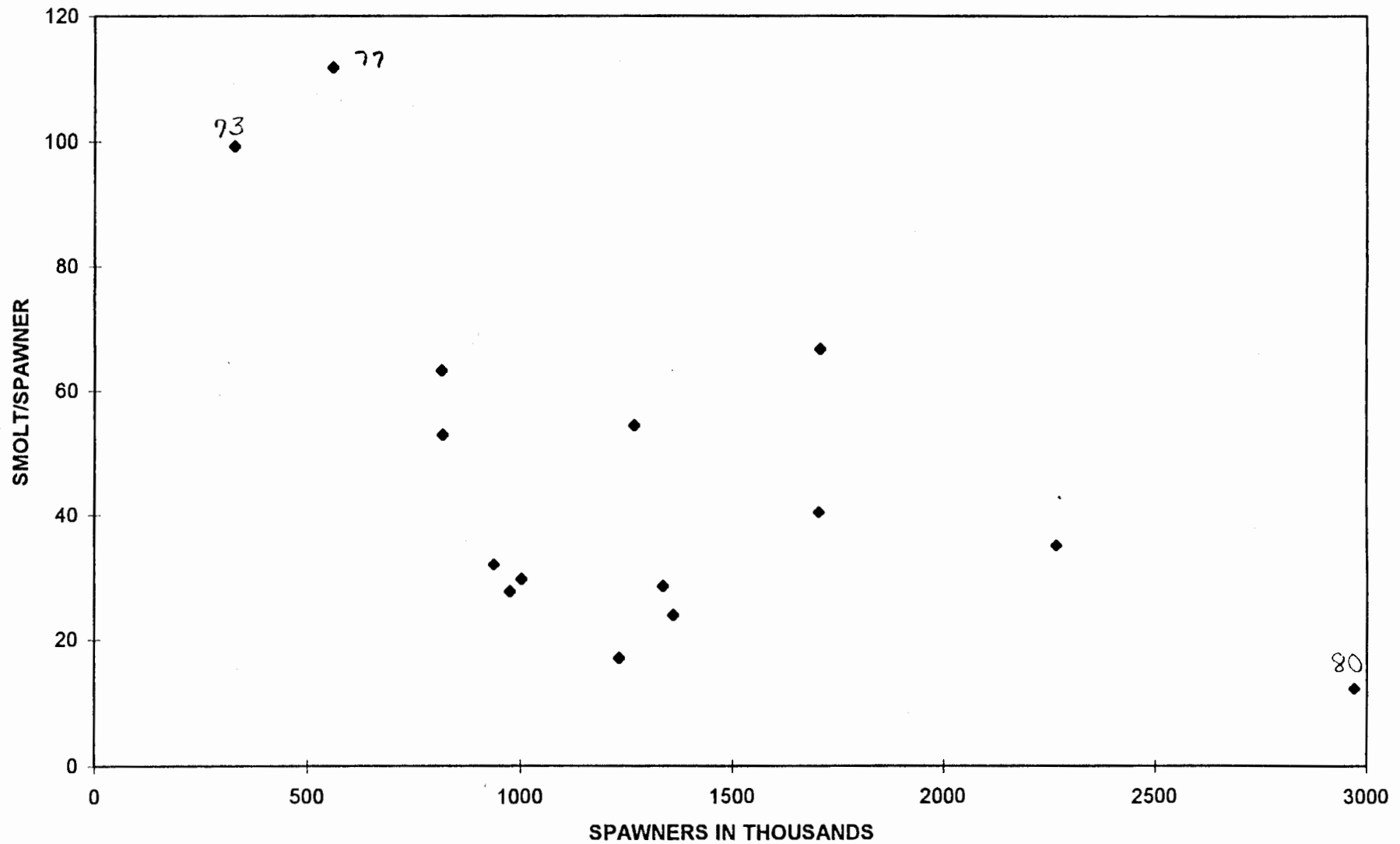


WOOD RIVER SOCKEYE SALMON SPAWNER-RECRUITS BY AGE



WOOD RIVER SOCKEYE SALMON

SPAWNERS VS SMOLT-PER-SPAWNER



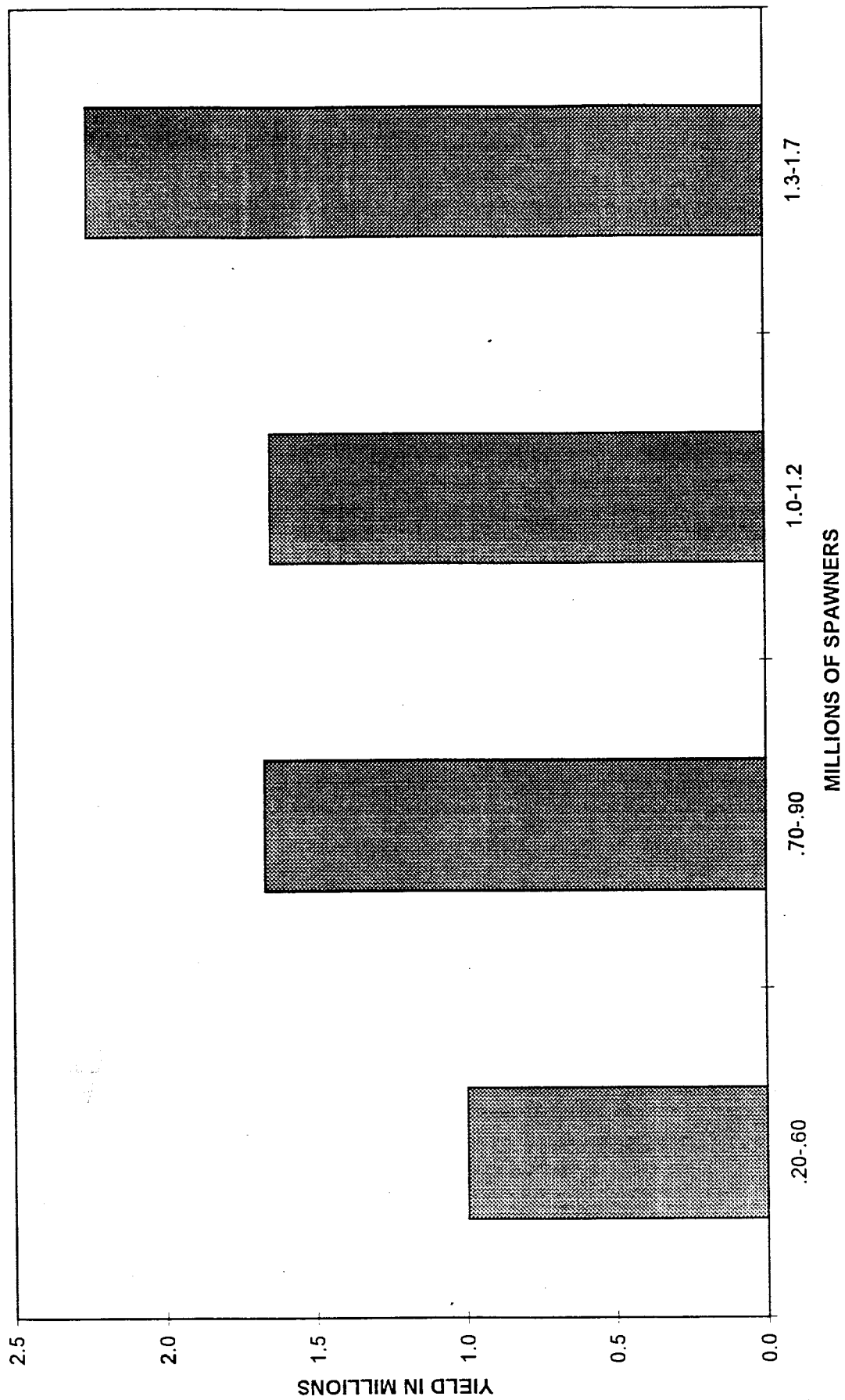
Significant with all years ($F=6.4$, $p=.02$)

Significant w/o 1980 ($F=4.3$, $p=.001$)

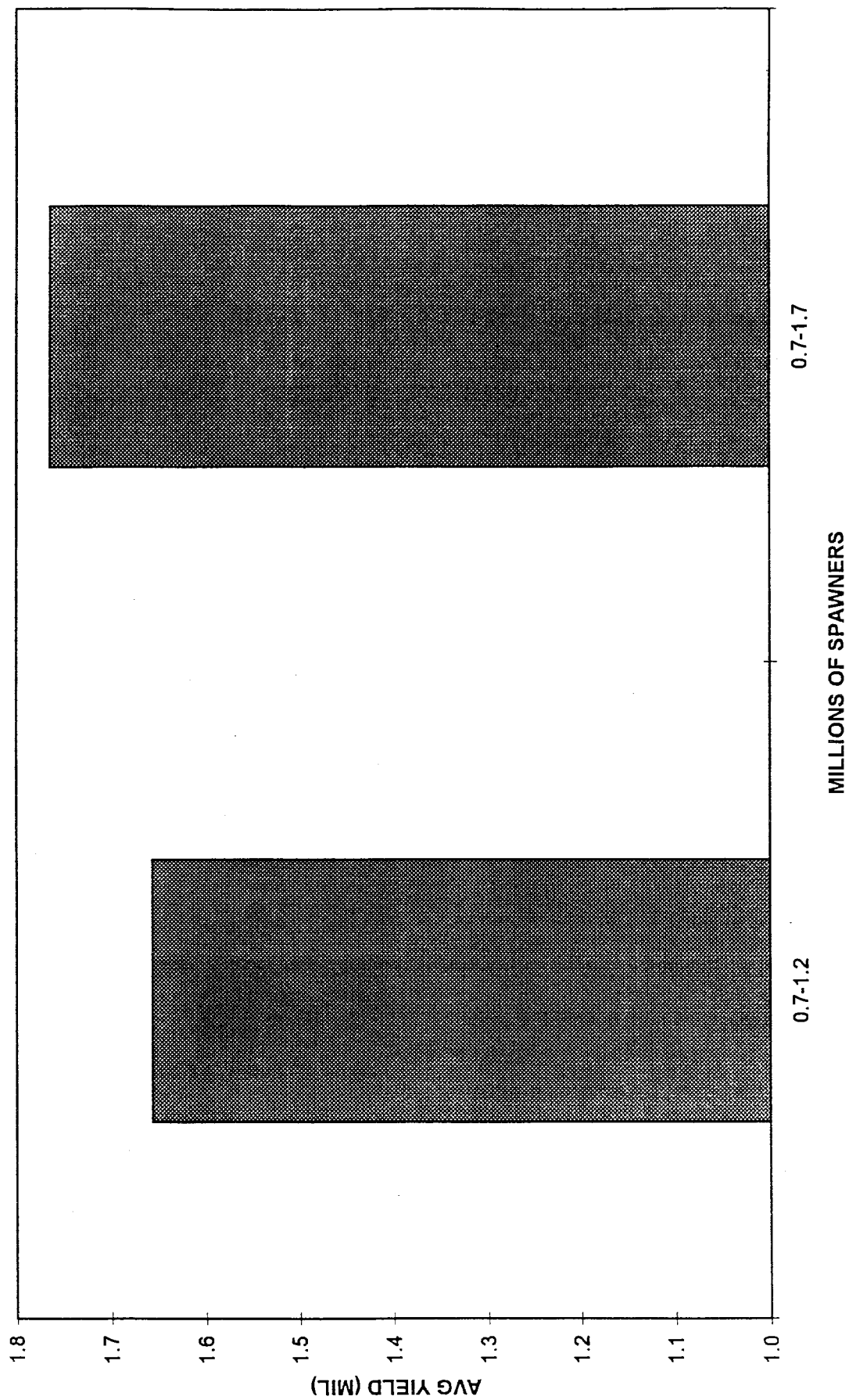
Not significant w/o 73 & 77

WOOD RIVER SOCKEYE SPAWNERS VS YIELD					
SORTED BY SPAWNERS					
	Year	Spawners	R/S	Recruits	Yield
	57	289	1.55	449	160
	73	330	4.50	1484	1154
	72	431	3.51	1514	1083
	61	461	3.25	1496	1035
	67	516	2.12	1092	576
	77	562	5.85	3290	2728
	69	604	1.38	833	229
	68	649	1.71	1108	459
	65	675	2.65	1787	1112
	63	721	1.98	1428	707
	56	773	1.91	1473	700
	76	817	7.00	5720	4903
	86	819	4.17	3413	2594
	71	851	1.53	1301	450
	88	867	3.73	3237	2370
	62	874	1.72	1503	629
	85	939	2.79	2617	1678
	58	960	2.75	2643	1683
	82	976	1.47	1438	462
	84	1003	1.99	1997	994
	60	1016	2.69	2733	1717
	64	1076	1.13	1220	144
	70	1162	2.41	2800	1638
	89	1186	3.61	4279	3093
	66	1209	1.75	2121	912
	81	1233	1.55	1909	676
	75	1270	3.77	4785	3515
	87	1337	1.84	2463	1126
	83	1361	2.35	3194	1833
	79	1706	2.45	4182	2476
	74	1709	3.02	5164	3455
	59	2209	0.82	1805	-404
	78	2267	1.45	3288	1021
	80	2963	0.53	1570	-1393
AVERAGE YIELD					
		.20-.60	995		
		.70-.90	1667		
		1.0-1.2	1643		
		1.3-1.7	2251		
		0.7-1.2	1657		
		0.7-1.7	1765		

WOOD RIVER SOCKEYE



WOOD RIVER SOCKEYE SALMON



filename: nushking.doc
 subject: Nushagak River chinook fishery evaluation
 date: October 14, 1996

DRAFT of problem statement and questions to address with regard to evaluating whether the commercial fishery of chinook salmon in the Nushagak district is affecting the escapement quality.

Problem statement: Current management practices in the commercial fishery may be negatively affecting chinook salmon escapement quality in the Nushagak River .

1. Have management practices changed? Look at three periods: prior to 1985, 1986-1991, and 1992 to present.

Sources of information: Tom Brookover's data
 Mike Nelson's Nushagak king salmon report
 Board of Fish report
 Recent AMR

Evaluate the following:

- 1) Effort levels and timing-Has there been increased effort early in the season?
- 2) Fishing time (hours) of large mesh vs. small mesh gear
- 3) Regulatory changes
 - a) May 1 opening changed to June 1 opening
 - b) Schedule of weekly fishing went away, replaced by E.O. opening beginning June 1.
 - c) King salmon fishing line was moved in.

2. Can we detect changes in escapement age or size composition for the previous time frames: prior to 1985, 1986-1991, and 1992 to present?

Sources of information: Carcass sampling
 Portage Creek reports
 Brood year tables

- a) Definition of quality - difference in age composition of escapement and total run
- b) Estimate percentage of large fish in escapement for years with true age data

1991-1996	Portage Creek data
1980-1986/87	Carcass data

- c) Reconstructing total runs for years where escapement samples are available.

- d) Calculate the differences in escapement and total run.

3. To what extent does the commercial fishery affect the age or size composition?

Total run
 Ratio of exploitation rate of large fish vs. exploitation rate of small fish
 Resultant escapement

During late 1980's to 1991, no large mesh directed fishery occurred on king salmon in the Nushagak River. The data from this period will be useful for reconstructing the total run size.

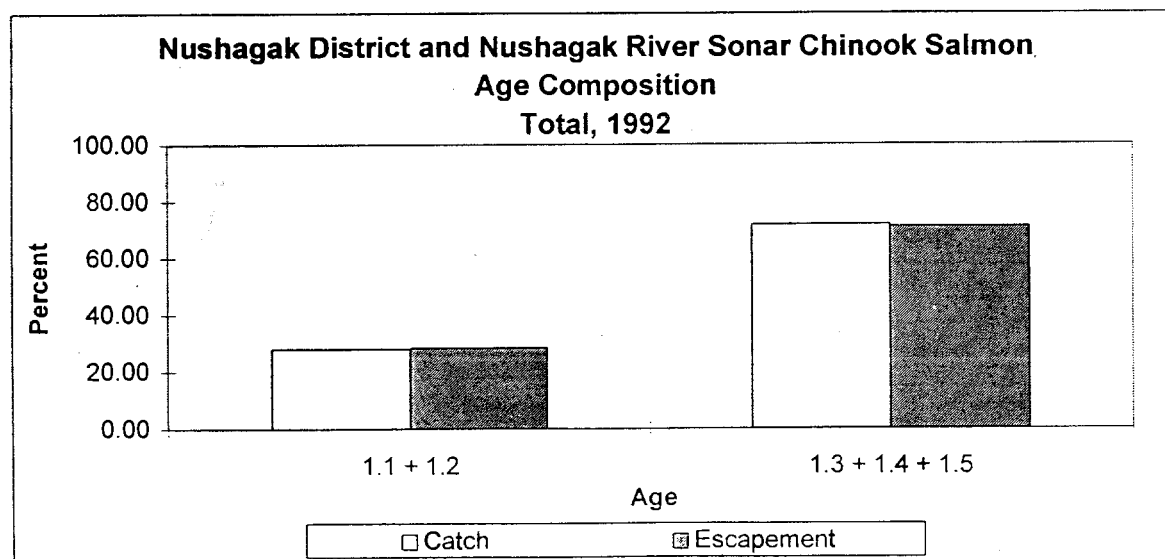
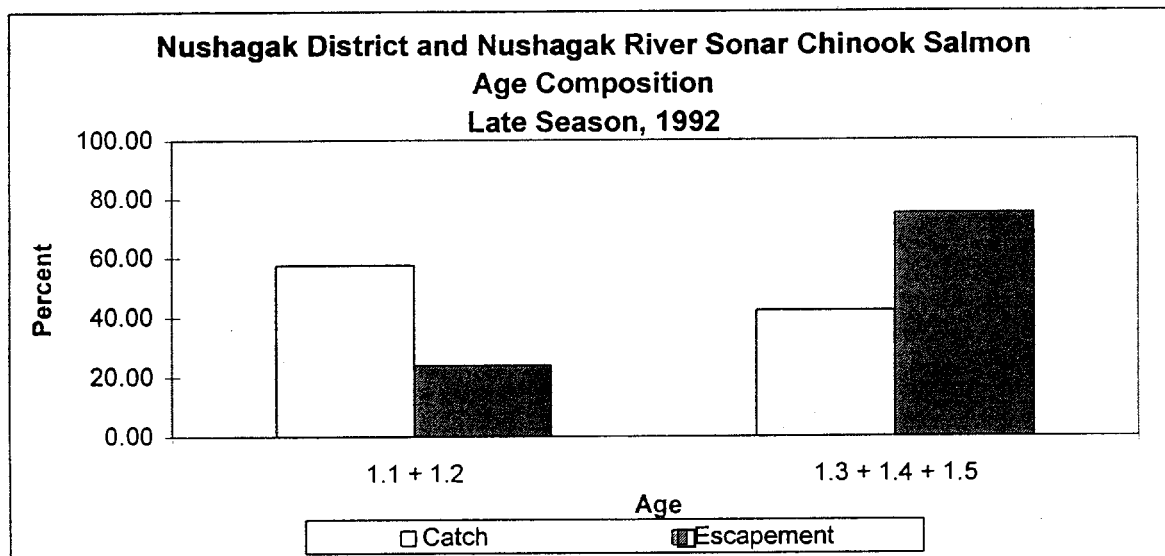
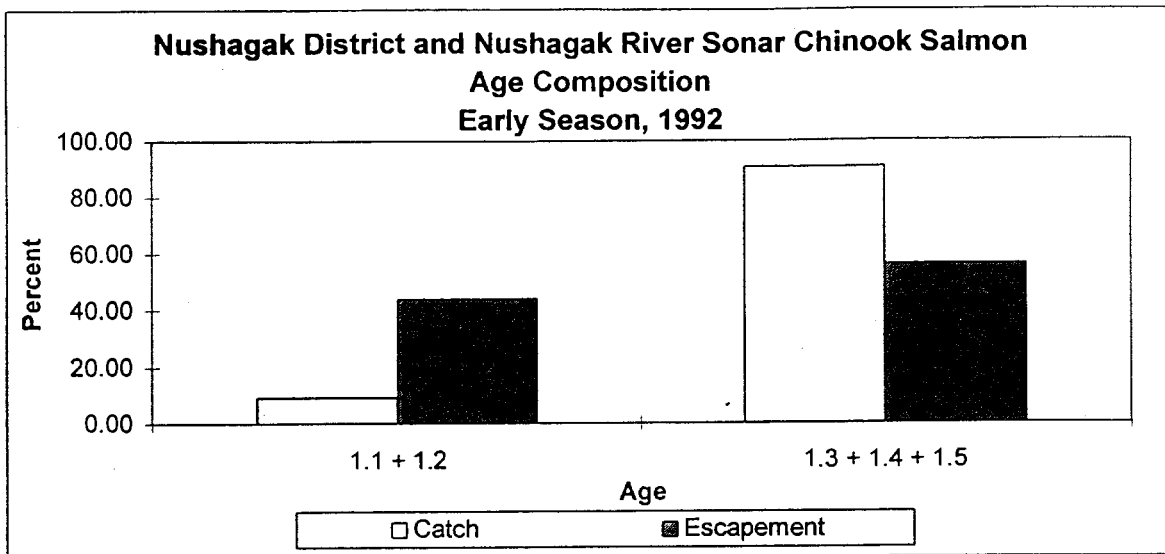
Recent year's with large mesh were 1995 and 1996.

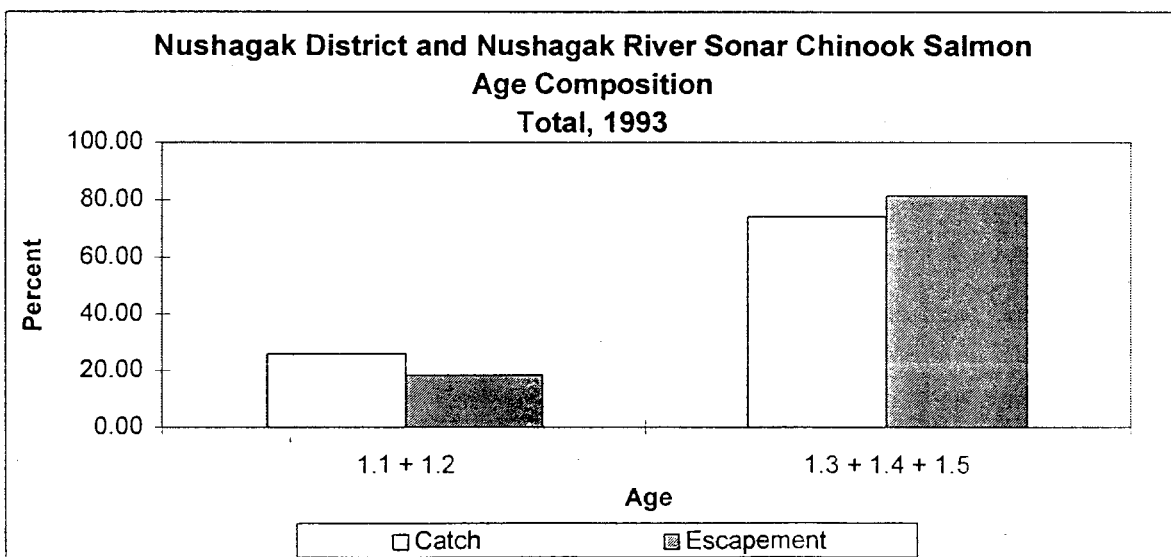
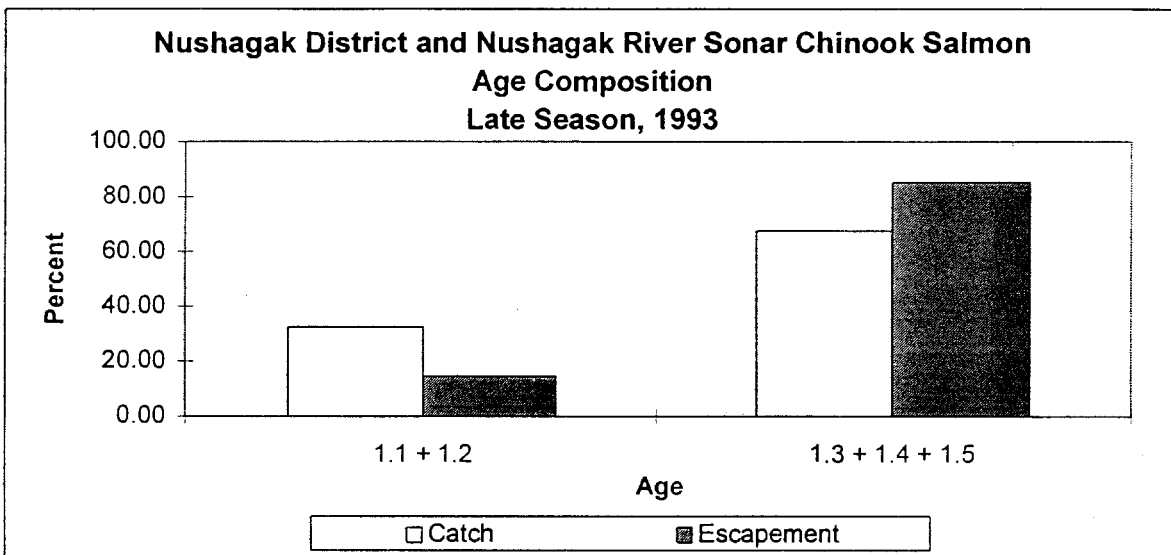
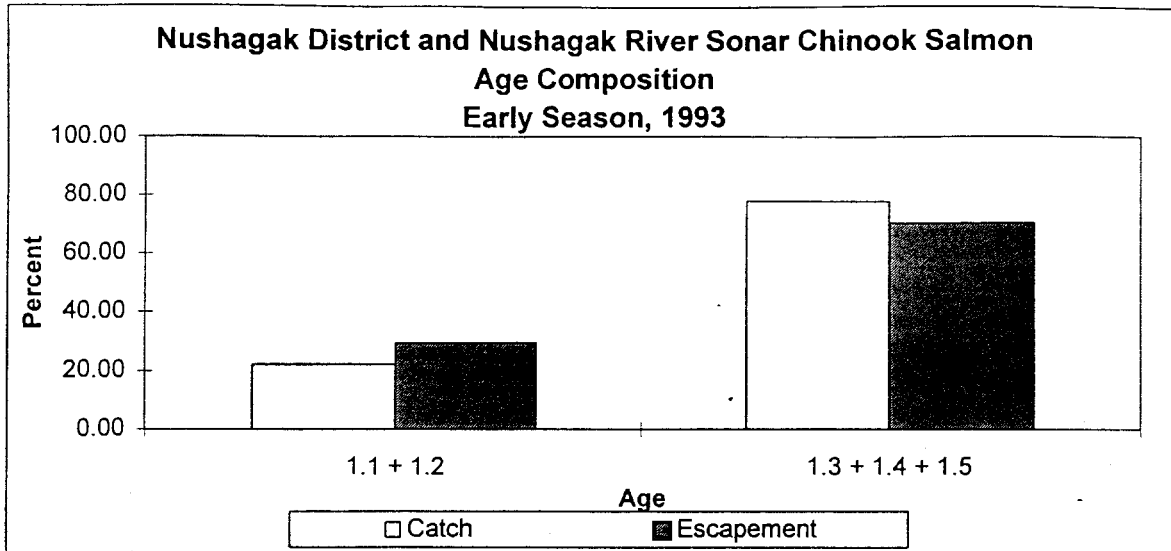
KINGAGE.XLS

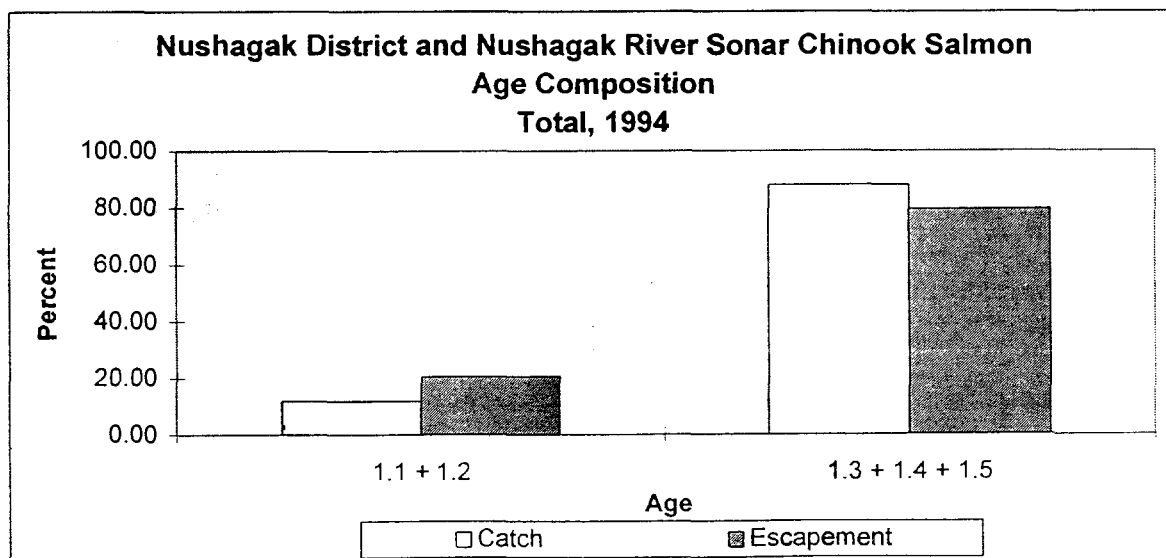
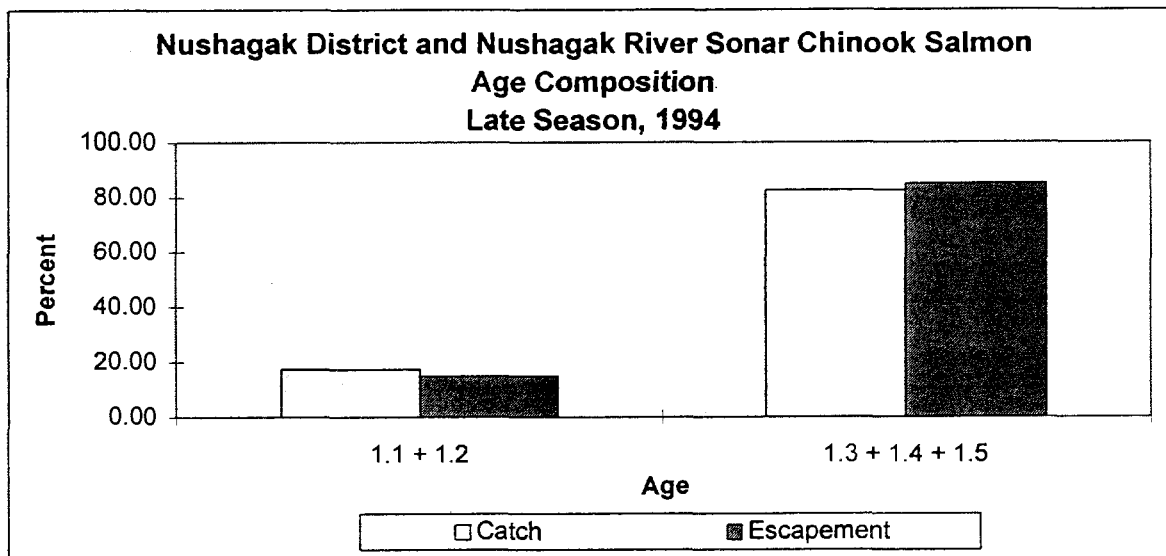
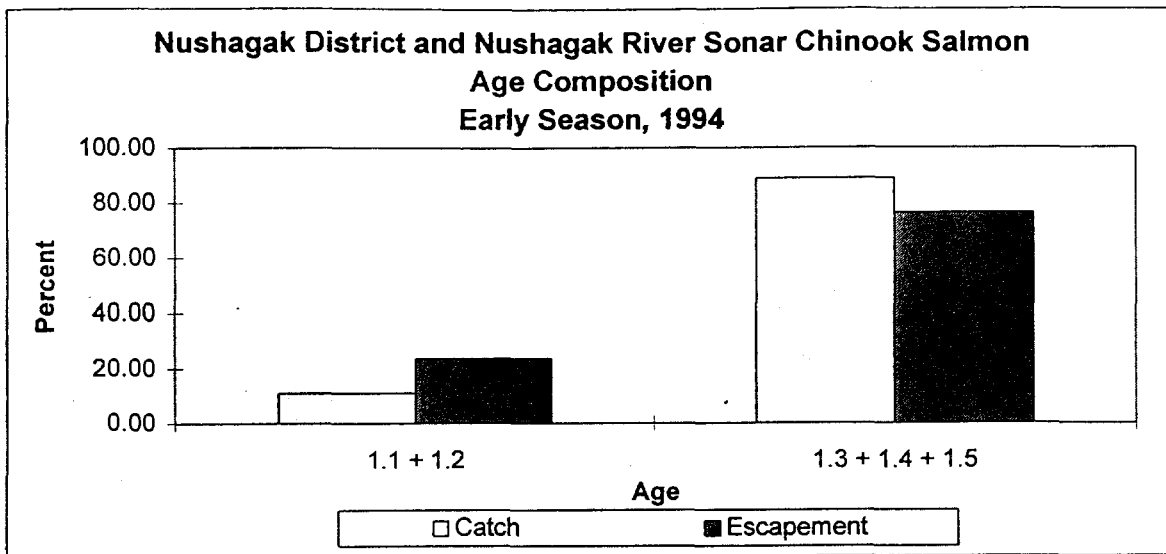
10/15/96

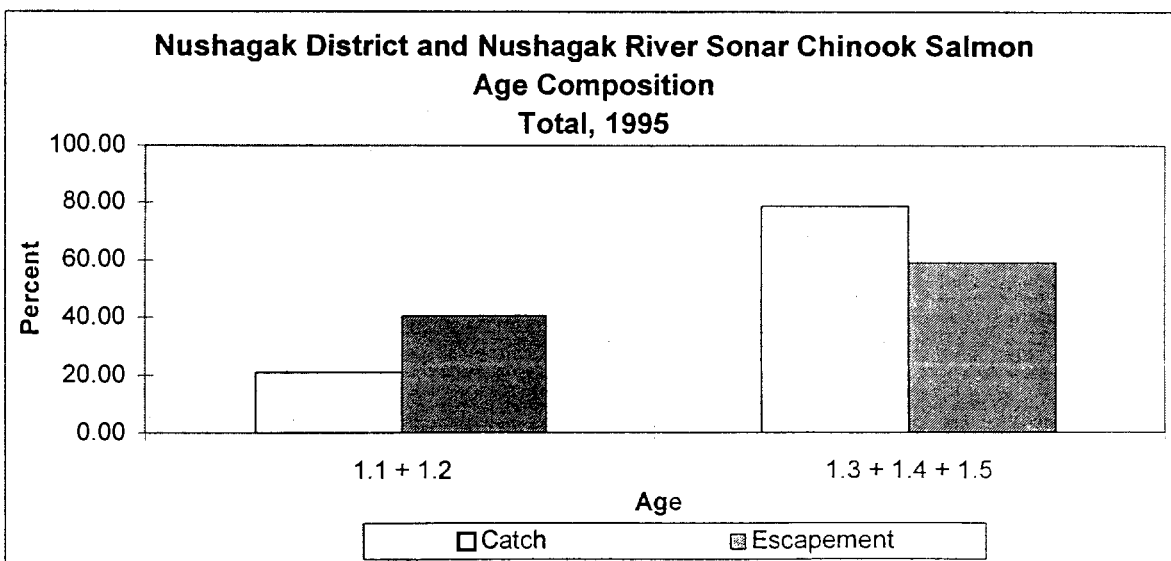
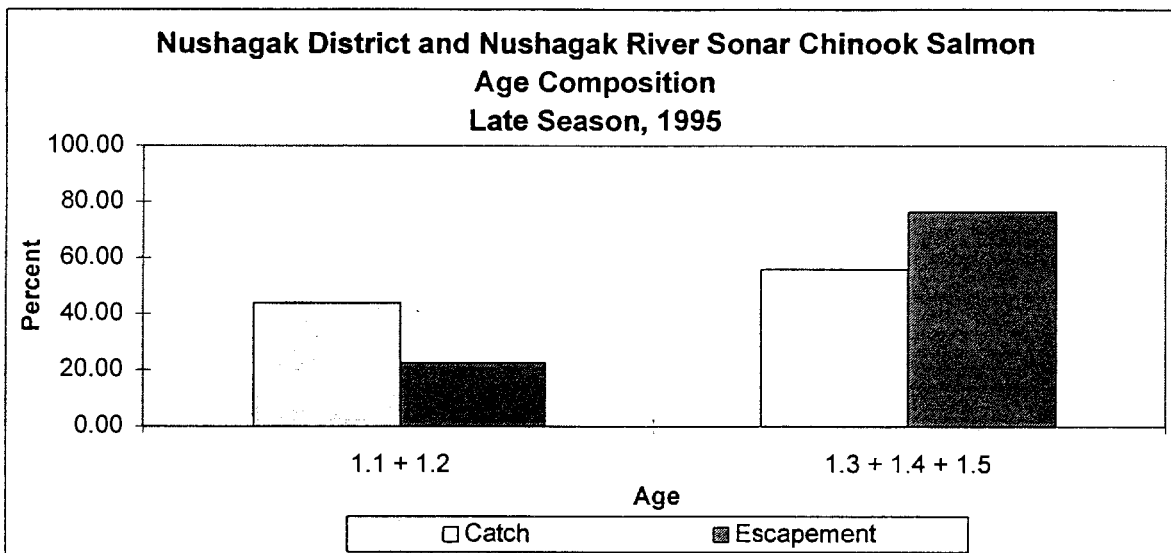
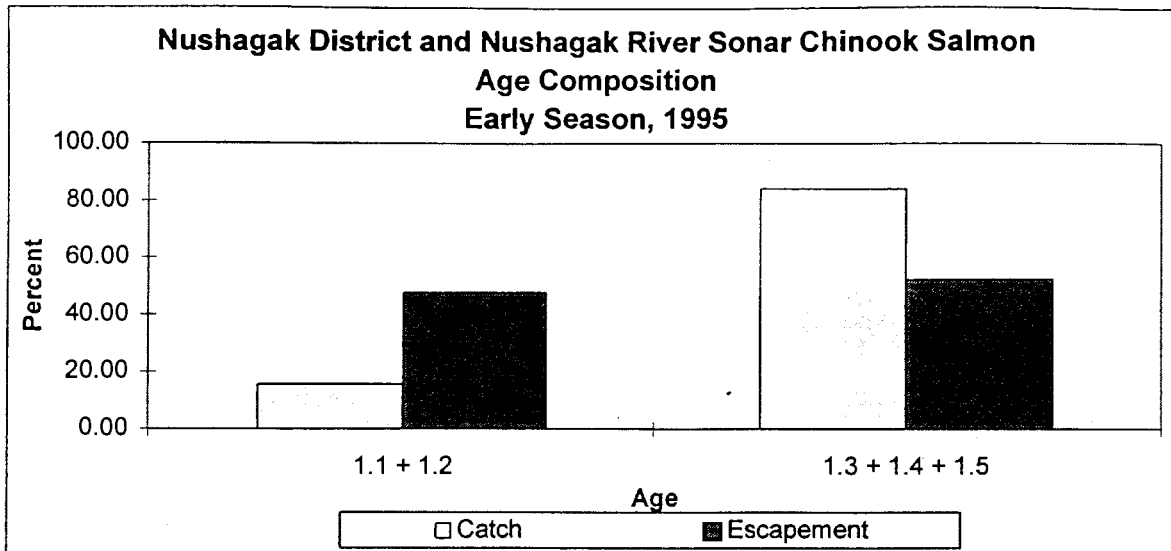
Nushagak district catch and Nushagak sonar escapement chinook salmon
age composition, small vs. large fish, early and late periods, 1992-1996.

Year	Sample Period	Catch or Escapement	Number	% by Age Group	
				1.1 + 1.2	1.3 + 1.4 + 1.5
1992	Early	Catch	29,154	9.14	90.67
		Escapement	18,350	44.03	55.97
	Late	Catch	18,743	57.61	42.22
		Escapement	64,498	23.96	75.12
	Total	Catch	47,897	28.11	71.70
		Escapement	82,848	28.40	70.88
1993	Early	Catch	39,536	22.22	77.77
		Escapement	25,702	29.57	70.43
	Late	Catch	22,750	32.36	67.64
		Escapement	72,110	14.53	85.32
	Total	Catch	62,286	25.93	74.08
		Escapement	97,812	18.48	81.41
1994	Early	Catch	100,878	10.98	88.94
		Escapement	62,920	23.56	76.44
	Late	Catch	18,602	17.35	82.65
		Escapement	33,034	14.96	85.04
	Total	Catch	119,480	11.97	87.96
		Escapement	95,954	20.60	79.41
1995	Early	Catch	64,752	15.66	84.16
		Escapement	61,353	47.65	52.34
	Late	Catch	15,428	43.80	55.95
		Escapement	24,269	22.55	76.47
	Total	Catch	80,180	21.07	78.74
		Escapement	85,622	40.53	59.18
1996	Early	Catch	56,256	9.18	90.82
		Escapement	33,765	43.43	56.56
	Late	Catch	17,109	28.04	71.96
		Escapement	18,362	23.24	75.36
	Total	Catch	73,365	13.58	86.42
		Escapement	52,127	36.32	63.19









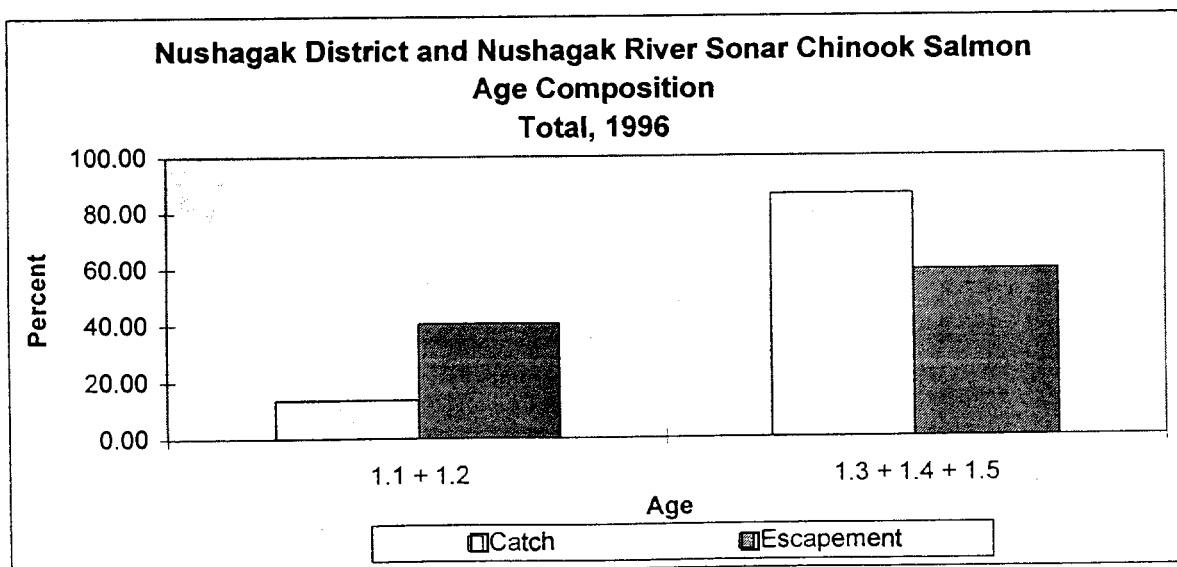
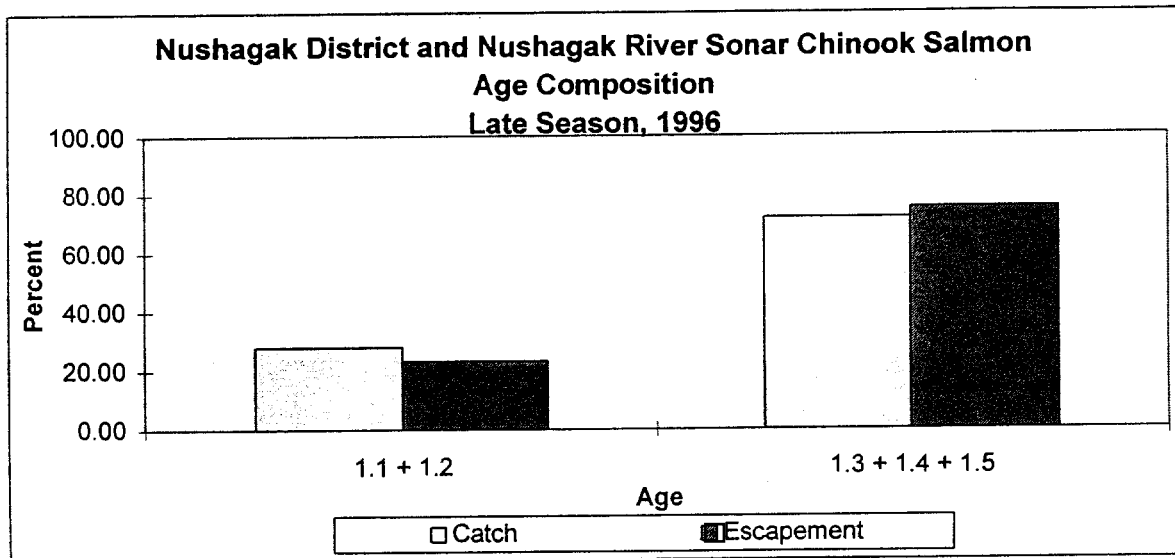
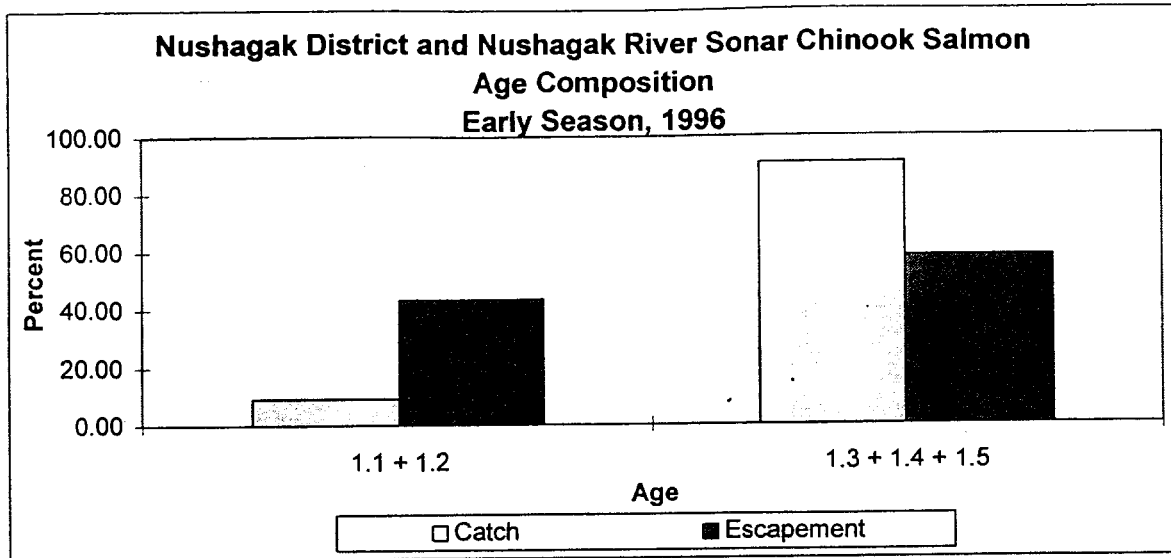
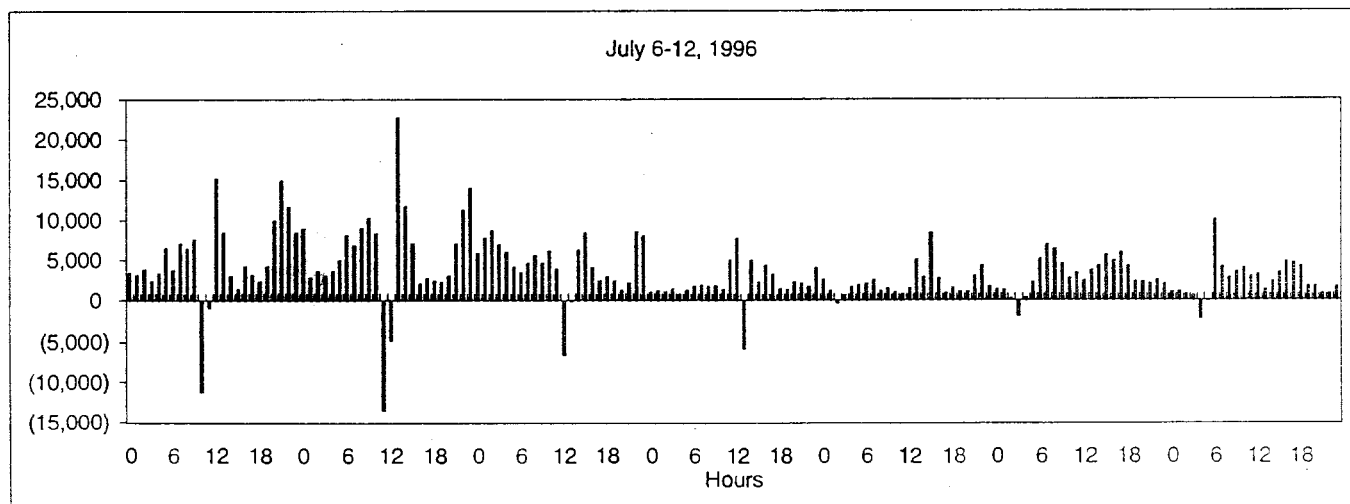
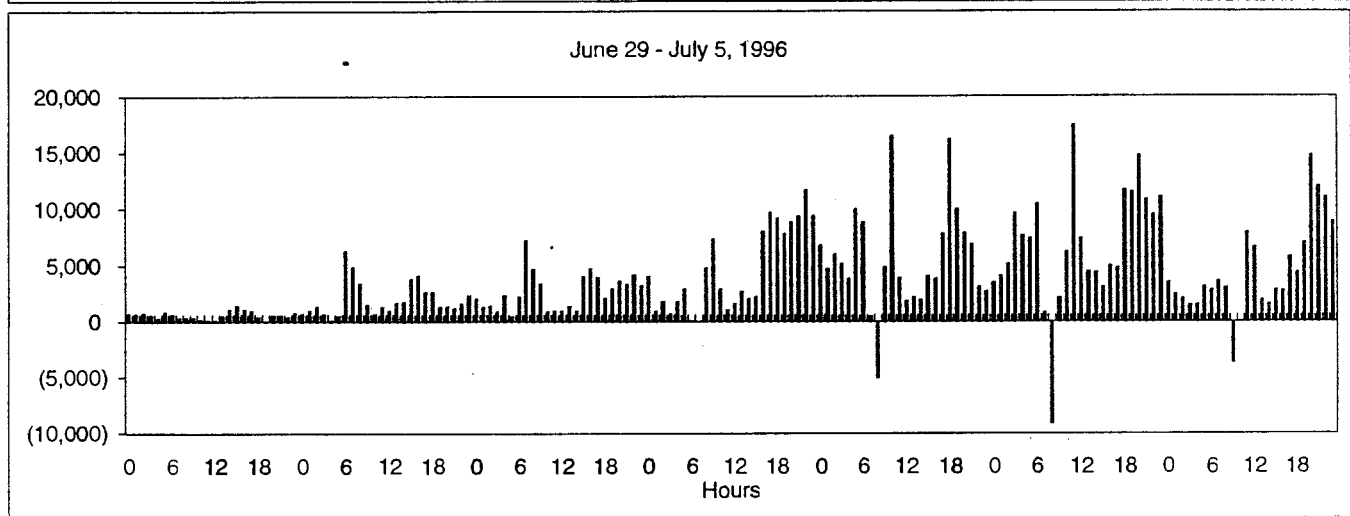
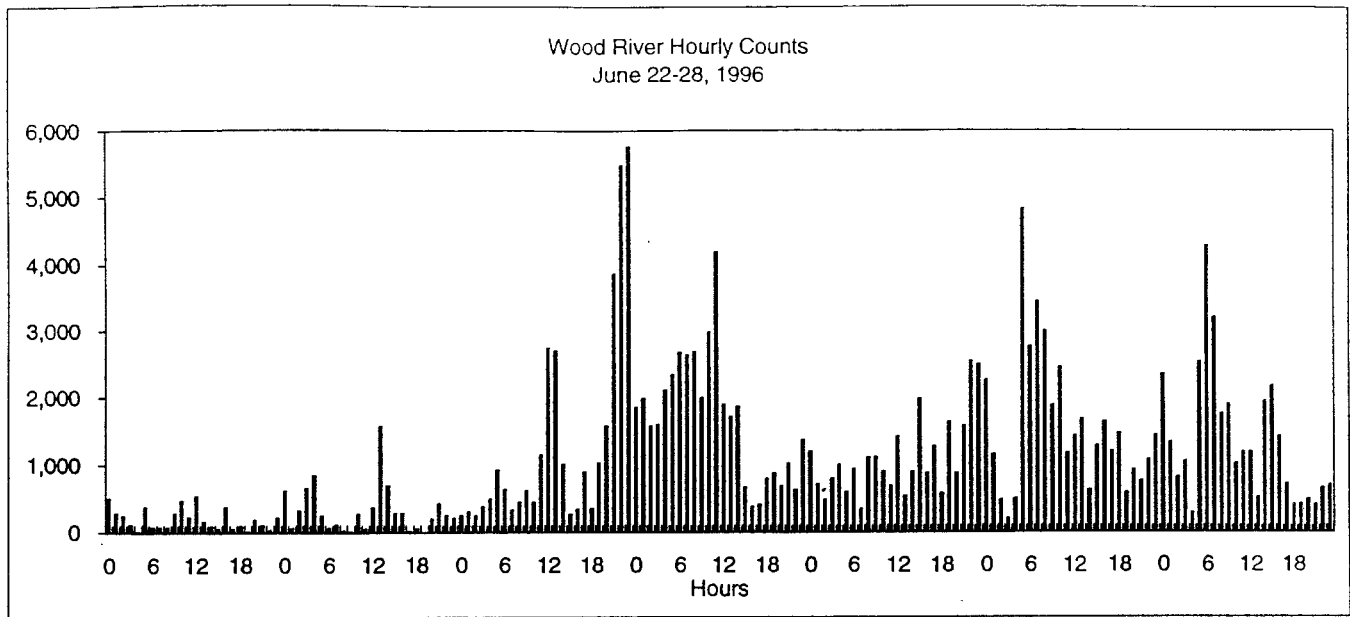


Table . Estimates of sockeye salmon escapement and their standard and relative errors for rivers on the Westside of Bristol Bay.

River	Year	Sockeye Salmon		Relative Error		
		Escapement	Standard Error	Total	Max. and Min. Daily	
Wood	1994	1,471,890	27,464	3.7%	83.2%	8.0%
	1995	1,482,162	29,320	3.9%	95.8%	3.1%
	1996	1,649,598	37,310	4.4%	51.7%	8.3%
Igushik	1994	445,920	8,903	3.9%	210.9%	11.4%
	1995	473,382	7,965	3.3%	99.4%	8.4%
Togiak	1995	185,718	4,290	4.5%	106.6%	11.6%



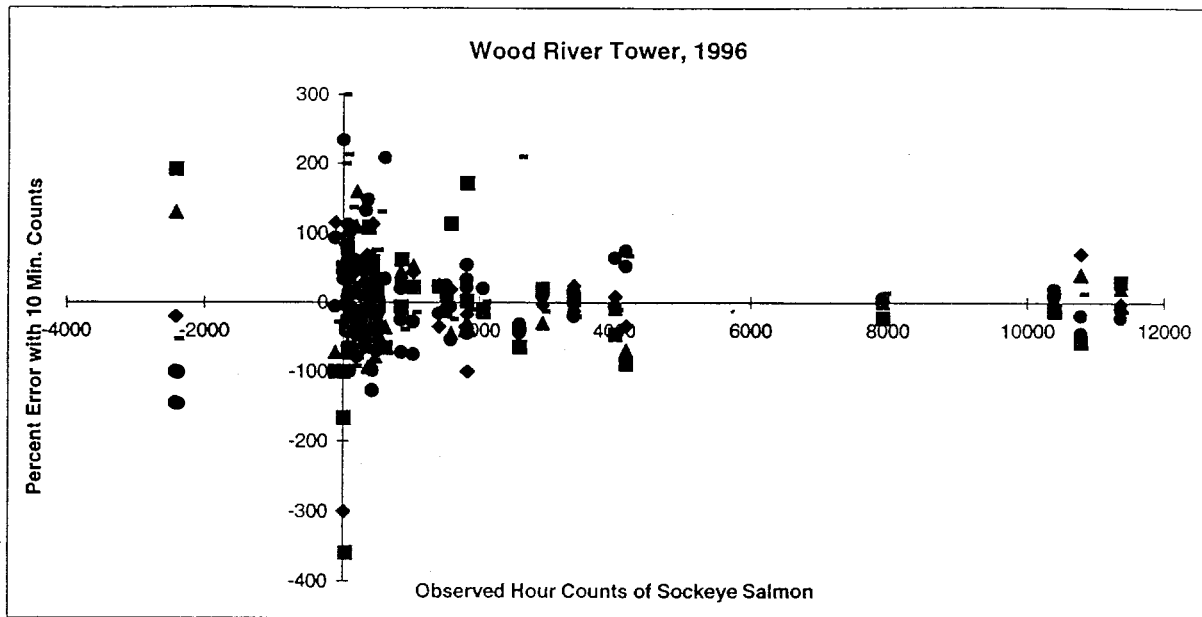


Figure . Distribution of percent error when using 10 minute counts to estimate hourly sockeye salmon passage.

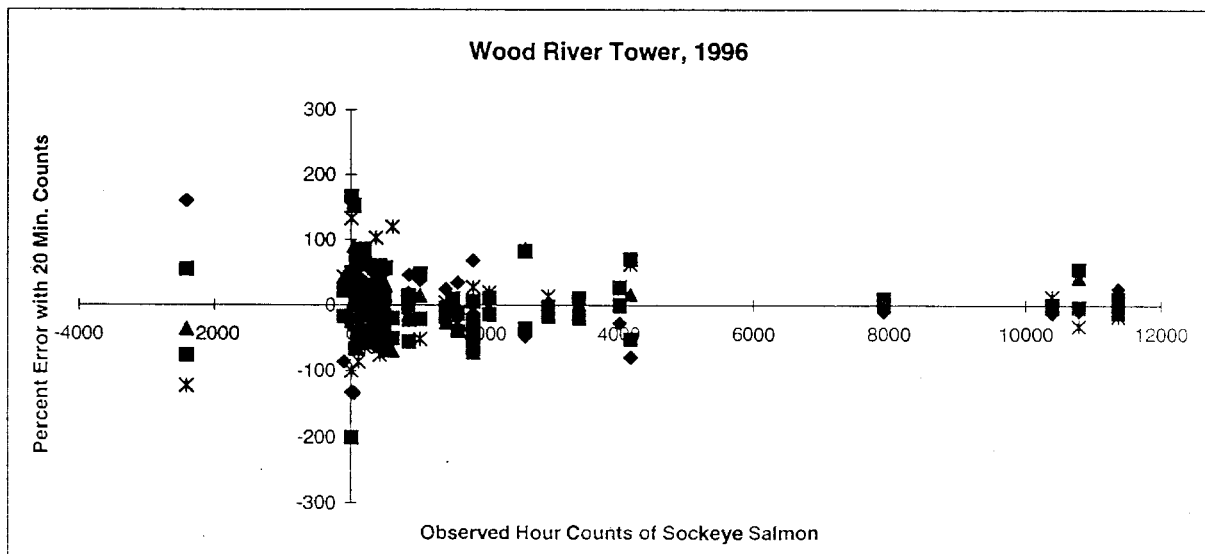
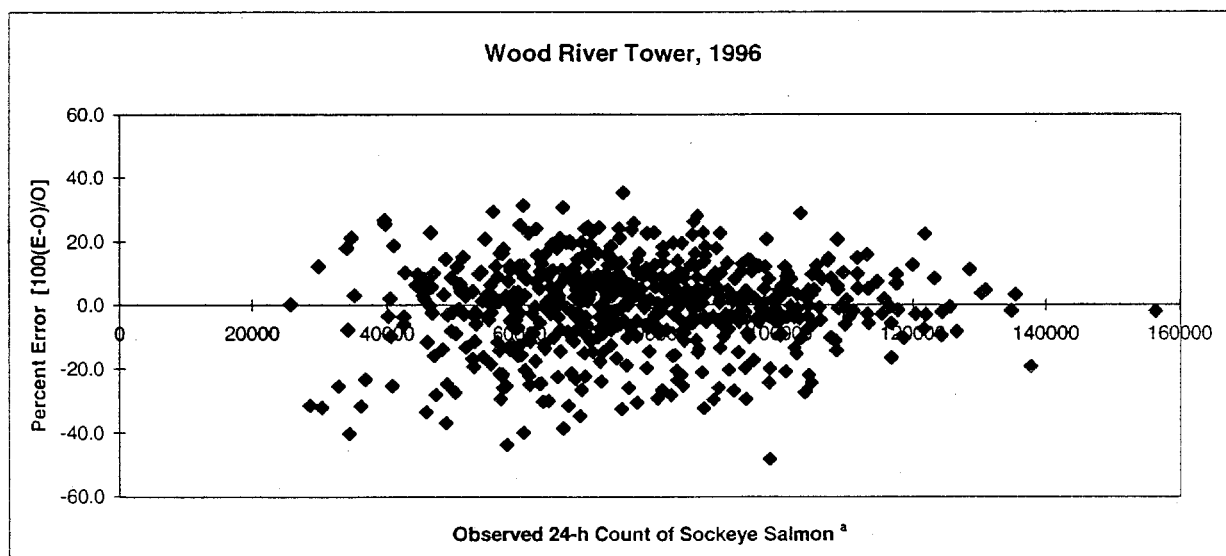
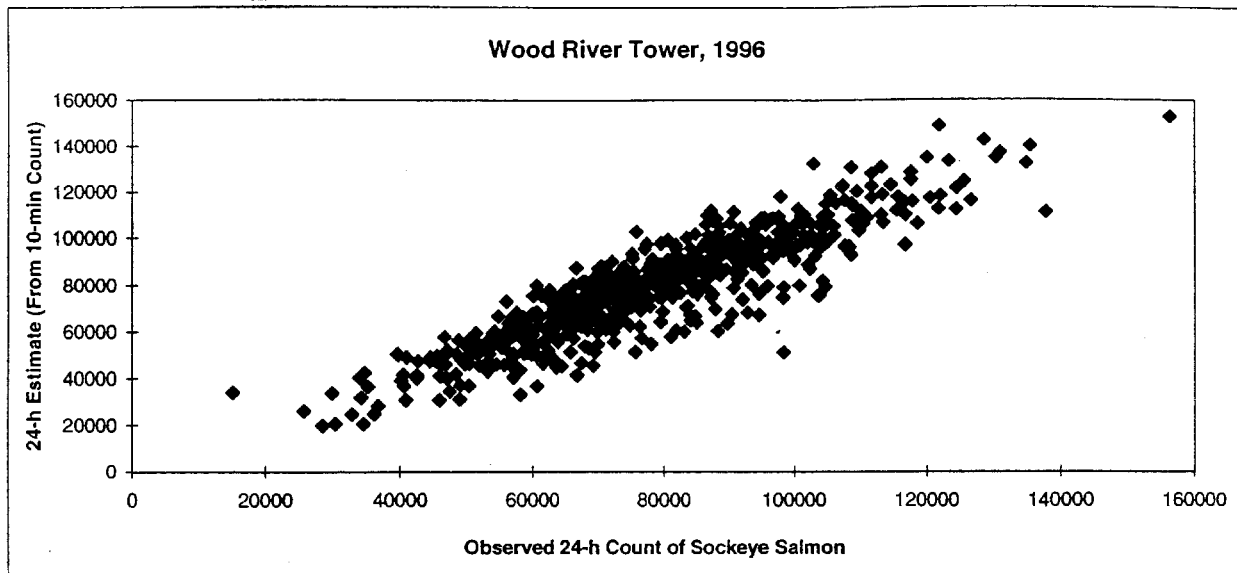


Figure . Distribution of percent error when using 20 minute counts to estimate hourly sockeye salmon passage.



^a An error of 123% (1 out of 600 observations) was omitted, for an observed count of 15,178.

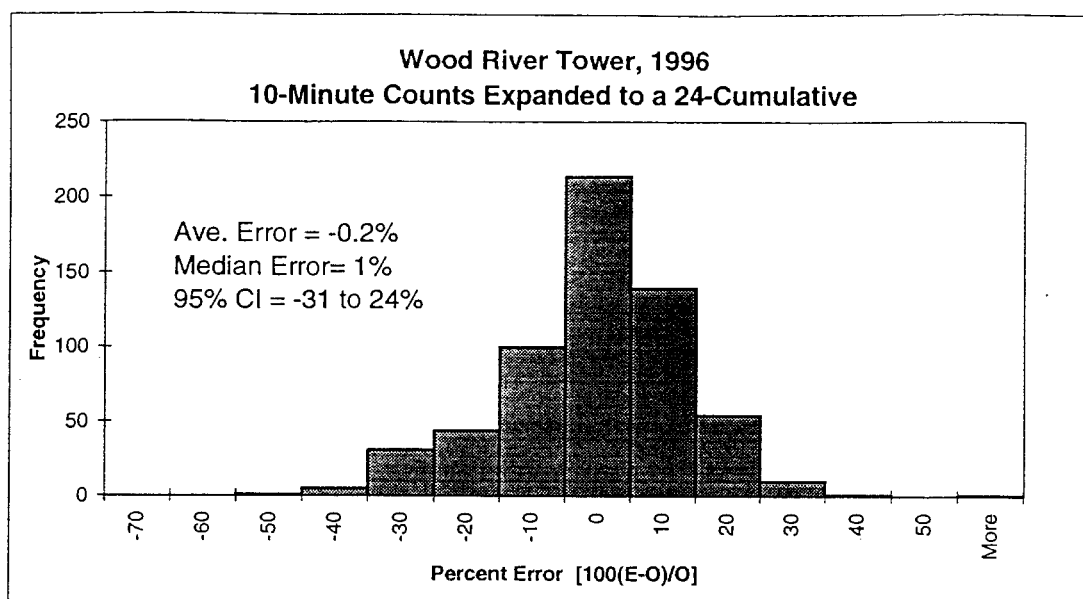


Figure . Distribution of errors associated with estimating daily passage from 10-minute counts from each bank over 24 hours. Total daily passage was the sum of 48 full hour counts (2 banks x 24 h) chosen with replacement from the full hour counts collected at Wood River, 1996.

"One Percent Rule" at Nushagak River sonar, 1987 - 1996.

PCRED1%.XLS

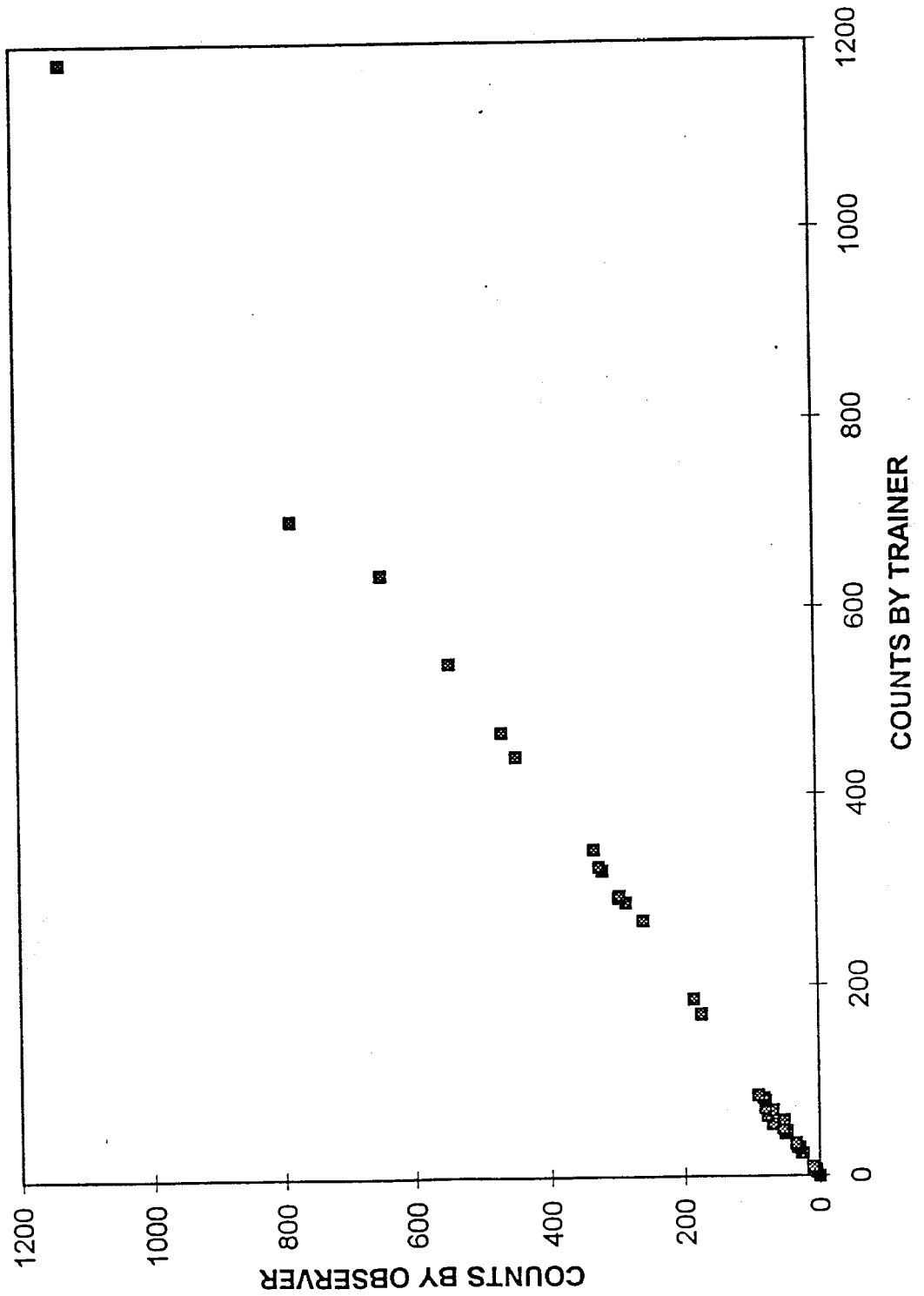
10/10/96

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Last Day of Counting	17-Aug	23-Aug	7-Aug	15-Sep	21-Aug	22-Jul	25-Aug	25-Aug	25-Aug	28-Aug
Total Escapement	388,034	483,200	513,421	680,368	492,522	695,108	715,099	509,326	281,307	503,651
1% Day ^a	12-Jul	16-Jul	15-Jul	15-Jul	8-Jul	17-Jul	11-Jul	22-Jul	15-Jul	27-Jul
Cum thru 1% Day	356,916	465,747	497,832	643,304	435,205	687,858	690,121	478,071	269,306	496,210
Difference	31,118	17,453	15,589	37,064	57,317	7,250	24,978	31,255	12,001	7,441
Percent of Total	8.0	3.6	3.0	5.4	11.6	1.0	3.5	6.1	4.3	1.5

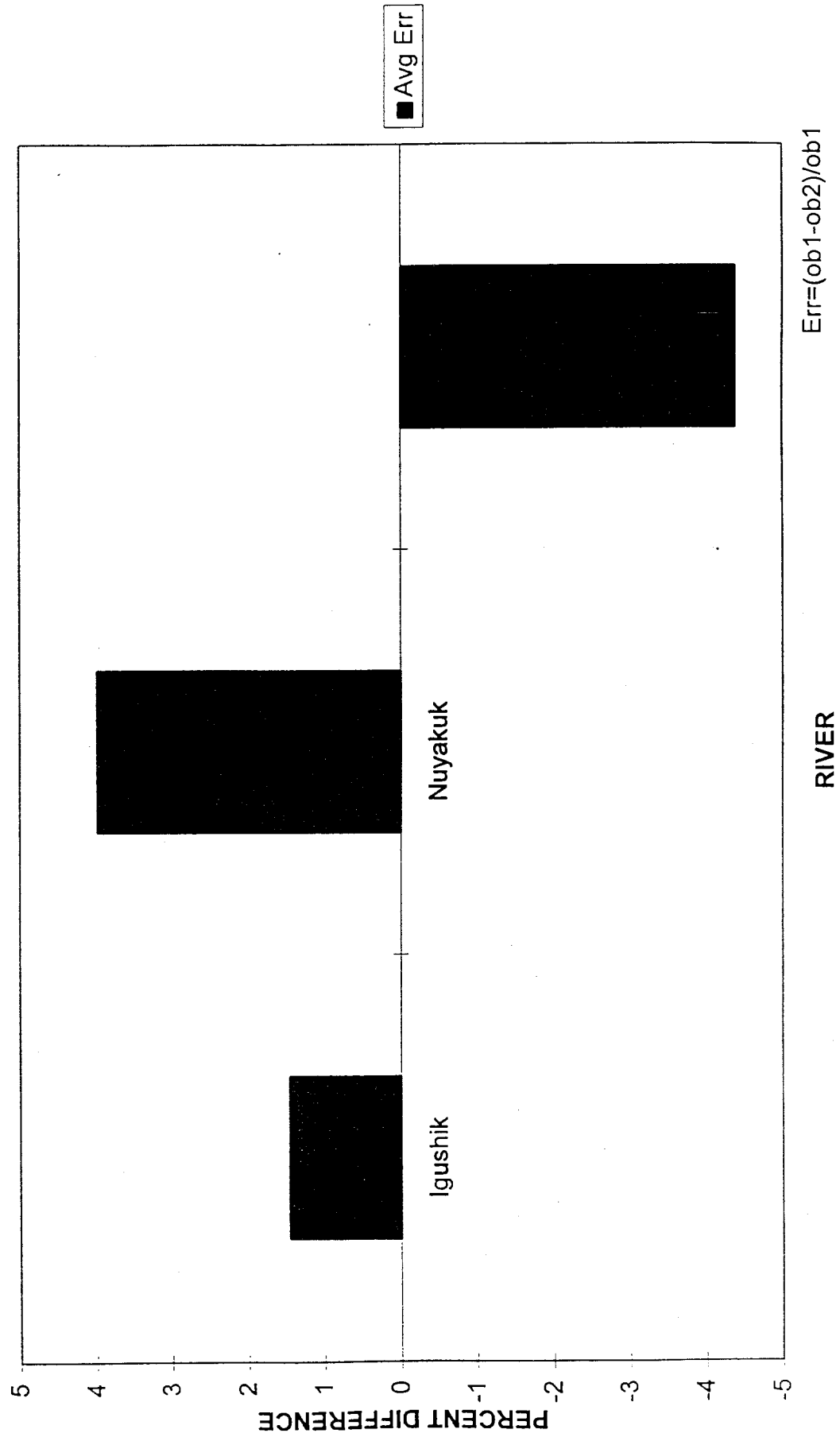
^a Third consecutive day of < 1%.

RESULTS FROM 1996 TOWER SCALE SAMPLING								
RIVER	SCALES REQUESTED	SCALES COLLECTED	% DEV	DESIRED AGES	ACTUAL AGES	% DEV	% UNUSABLE	
KVICHAK	1,500	1,579	5.3	1,200	1,305	8.8	17.4	
NAKNEK	1,500	1,394	-7.1	1,200	1,253	4.4	10.1	
EGEGIK	1,500	1,415	-5.7	1,200	1,243	3.6	12.2	
UGASHIK	1,500	1,501	0.1	1,200	1,260	5.0	16.1	
WOOD	1,200	1,400	16.7	1,100	1,148	4.4	18.0	
IGUSHIK	800	1,060	32.5	730	748	2.5	29.4	
NUYAKUK	800	834	4.3	730	591	-19.0	29.1	
TOGIAK	900	1,024	13.8	730	745	2.1	27.2	

WESTSIDE CALIBRATION COUNTS 1996



1996 WESTSIDE COUNT DIFFERENCES



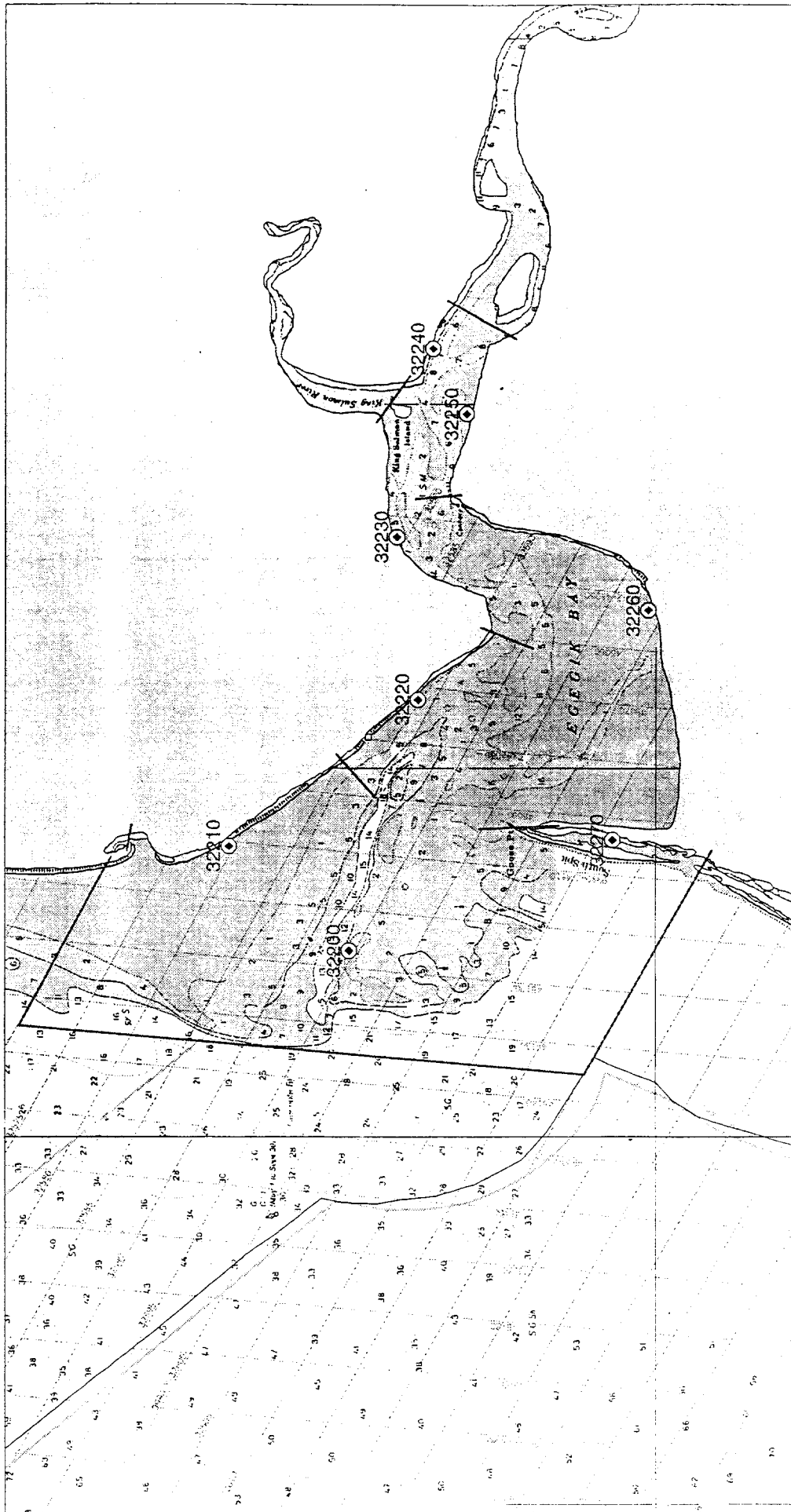
BRISTOL BAY STATISTICAL AREAS (9/94)

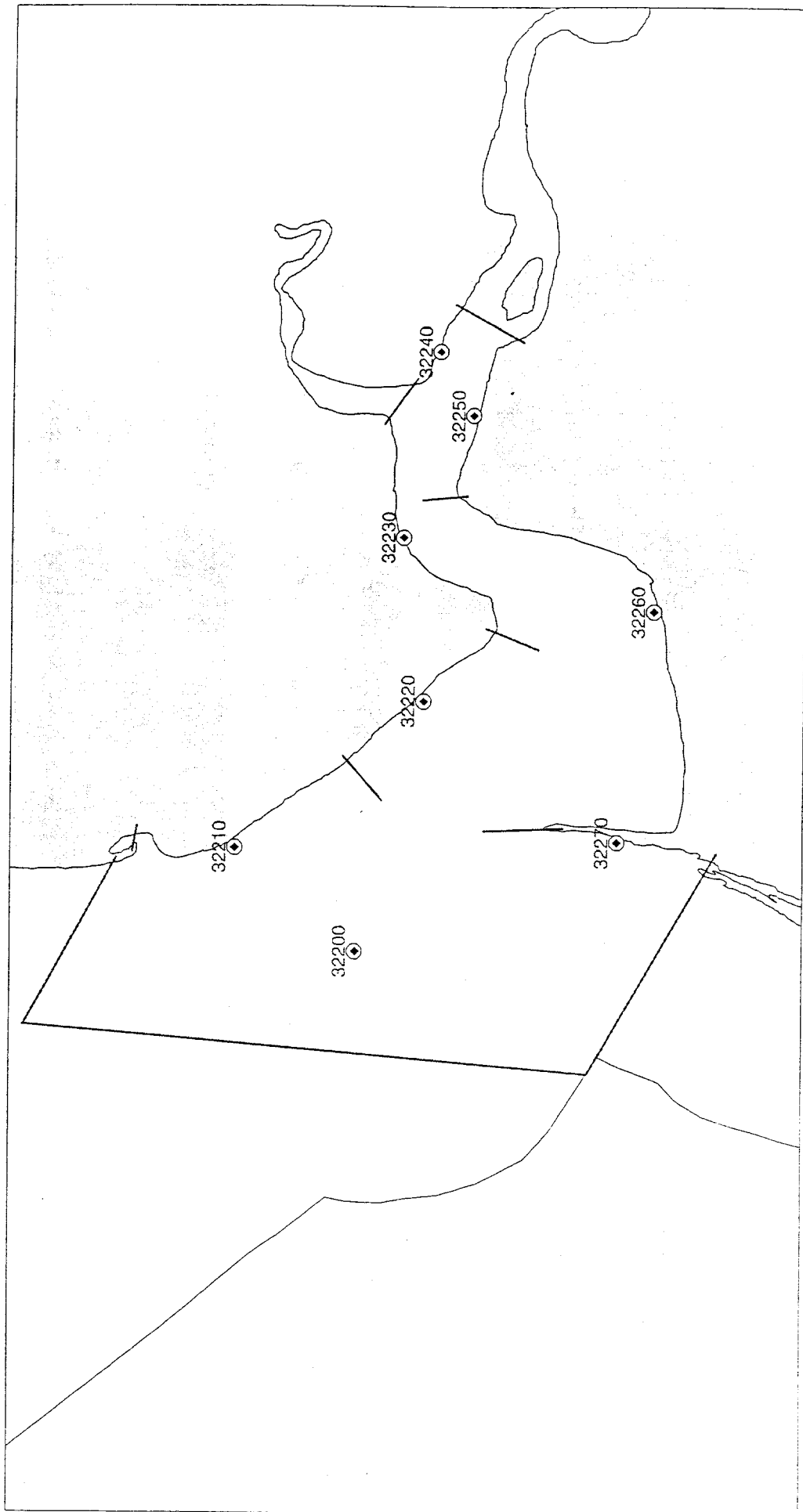
<u>AREA</u>	<u>CODE</u>	<u>GEAR</u>
Naknek-Kvichak District	324-00	drift only
NW-marker to Copenhagen Cr.	324-11	set only
Copenhagen Cr. to SW-marker	324-12	set only
Graveyard to Libbyville	324-13	set only
Libbyville to Pederson Pt.	324-23	set only
Pederson Pt. to N. Naknek Pt.	324-22	set only
S. Naknek Pt. to Johnson Hill	324-21	set only
Egegik District	322-00	drift only
Big Cr. to Bishop Cr.	322-10	set only
Bishop Cr. to Coffee Pt.	322-20	set only
Coffee Pt. to King Salmon R.	322-30	set only
King Salmon R. to N. bank marker	322-40	set only
S. bank marker to Egegik	322-50	set only
Egegik to Goose Pt.	322-60	set only
Goose Pt. to S. district marker	322-70	set only
Ugashik District	321-00	drift only
Cape Greig to Smokey Pt.	321-10	set only
Smoky Pt. to Dago Cr.	321-20	set only
Dago Cr. to Pilot Pt.	321-30	set only
Pilot Pt. to Upper district marker	321-40	set only
Ugashik Village	321-50	set only
Upper district marker to S. Spit	321-60	set only
S. Spit to Cape Menshikof	321-70	set only
Nushagak District	325-00	drift only
Igushik Section	325-10	drift only
"	325-11	set only
Snake R. Section	325-21	set only
Nushagak Section	325-30	drift only
Combine Flats	325-31	set only
Queens Slough	325-32	set only
Clark's Point	325-33	set only
Ekuk/Flounder Flats	325-34	set only
Coffee Point	325-35	set only
Togiak district-Kulukak Section	326-10	drift only
"	326-11	set only
Togiak River Section	326-70	drift only
Eastside	326-71	set only
Westside	326-72	set only
Matogak Section	326-20	drift only
"	326-21	set only
Osviak Section	326-30	drift only
"	326-31	set only
Cape Pierce Section	326-40	drift only
"	326-41	set only

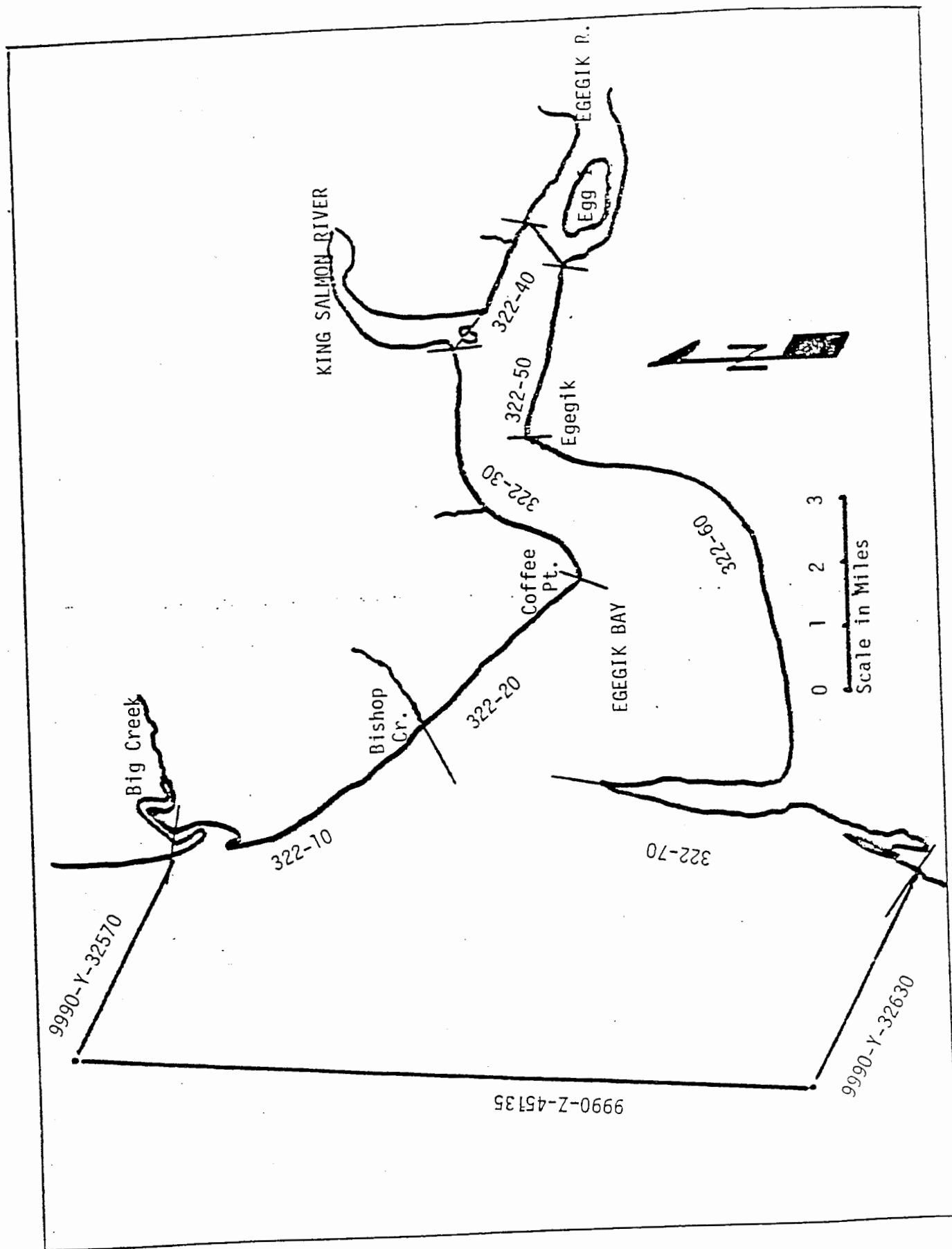
Alaska Department of Fish and Game
Division of Commerical Fisheries Management and Development

Bristol Bay Salmon Statistical Areas

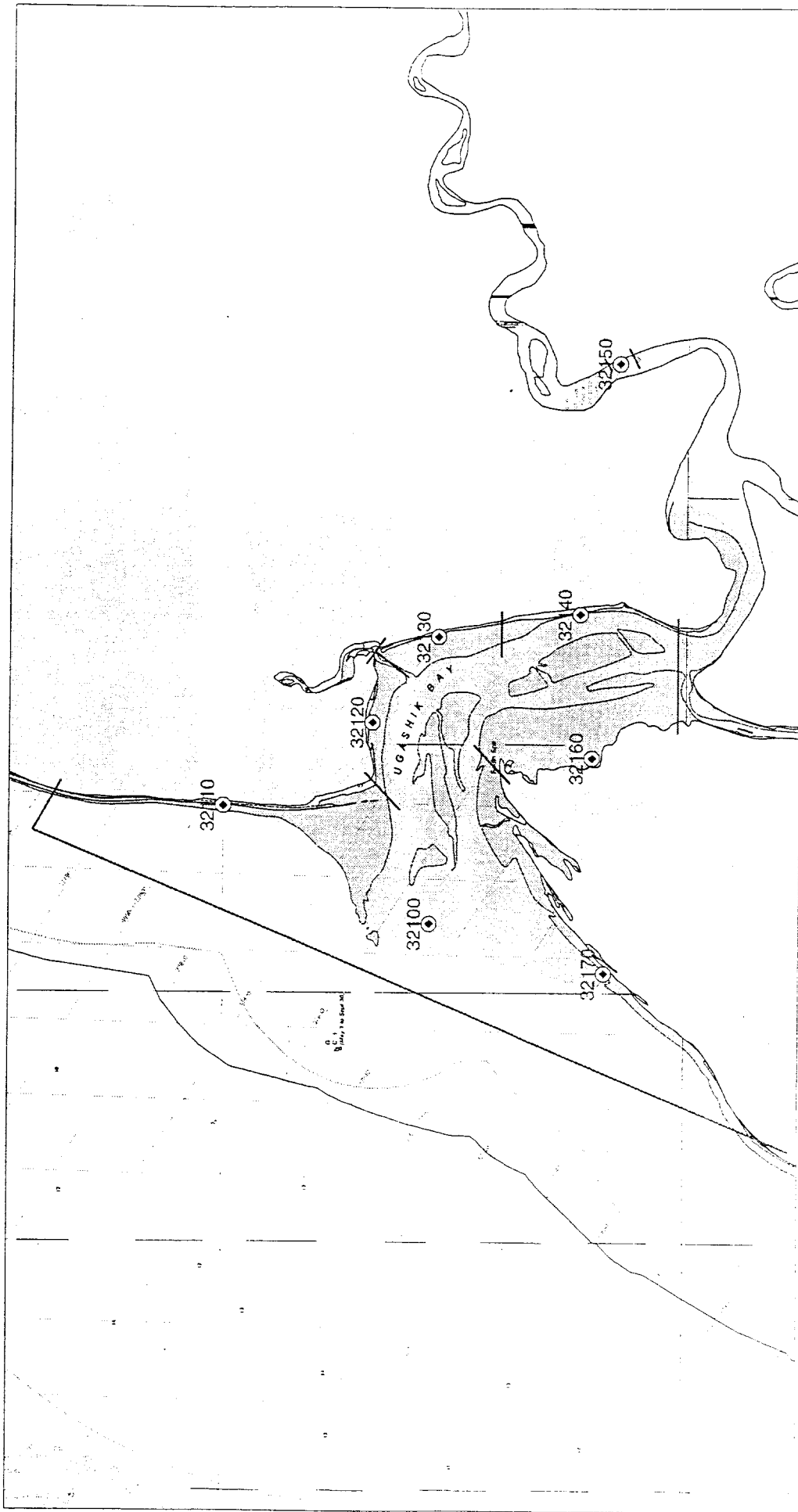
Description	Statarea	District	Subdist	River	Type	Anad. Waters Catalog
Ugashik District	321-00	321	00		Drift Only	
Ugashik River	321-00-100	321	00	100	River	321-10-10020
Cape Grieg to Smokey Point	321-10	321	10		Set Only	
Smokey Point to Dago Creek	321-20	321	20		Set Only	
Dago Creek to Pilot Point	321-30	321	30		Set Only	
Pilot Point to Upper district marker	321-40	321	40		Set Only	
Ugashik Village	321-50	321	50		Set Only	
Upper district marker to S. Spit	321-60	321	60		Set Only	
S. Spit to Cape Menshikof	321-70	321	70		Set Only	
Egegik District	322-00	322	00		Drift Only	
Egegik River	322-00-100	322	00	100	River	322-10-10080
Big Creek to Bishop Creek	322-10	322	10		Set Only	
Bishop Creek to Coffee Point	322-20	322	20		Set Only	
Coffee Point to King Salmon River	322-30	322	30		Set Only	
King Salmon River to N. Bank marker	322-40	322	40		Set Only	
S. Bank marker to Egegik	322-50	322	50		Set Only	
Egegik to Goose Point	322-60	322	60		Set Only	
Goose Point to S. district marker	322-70	322	70		Set Only	
Naknek-Kvichak District	324-00	324	00		Drift Only	
Kvichak River	324-10-100	324	10	100	River	324-10-10150
NW-marker to Copenhagen Creek	324-11	324	11		Set Only	
Copenhagen Creek to SW-marker	324-12	324	12		Set Only	
Graveyard to Libbyville	324-13	324	13		Set Only	
Naknek River	324-20-600	324	20	600	River	324-20-10140
S. Naknek Point to Johnson Hill	324-21	324	21		Set Only	
Pederson Point to N. Naknek Point	324-22	324	22		Set Only	
Libbyville to Pederson Point	324-23	324	23		Set Only	
Nushagak District	325-00	325	00		Drift Only	
Igushik Section	325-10	325	10		Drift Only	
Igushik River	325-10-100	325	10	100	River	325-10-10010
"	325-11	325	11		Set Only	
Snake River Section	325-21	325	21		Set Only	
Nushagak Section	325-30	325	30		Drift Only	
Wood River	325-30-300	325	30	300	River	325-30-10100-2031
Nushaghak River	325-30-700	325	30	700	River	325-30-10100
Nuyakuk River	325-30-800	325	30	800	River	325-30-10100-2249
Combine Flats	325-31	325	31		Set Only	
Queens Slough	325-32	325	32		Set Only	
Clark's Point	325-33	325	33		Set Only	
Ekuk/Flounder Flats	325-34	325	34		Set Only	
Coffee Point	325-35	325	35		Set Only	
Togiak District	326-00	326	00		District	
Kulukuk Section	326-10	326	10		Drift Only	
"	326-11	326	11		Set Only	
Matogak Section	326-20	326	20		Drift Only	
"	326-21	326	21		Set Only	
Osviak Section	326-30	326	30		Drift Only	
"	326-31	326	31		Set Only	
Cape Pierce Section	326-40	326	40		Drift Only	
"	326-41	326	41		Set Only	
Togiak River Section	326-70	326	70		Drift Only	
Togiak River	326-70-600	326	70	600	River	326-00-10400
Eastside	326-71	326	71		Set Only	
Westside	326-72	326	72		Set Only	

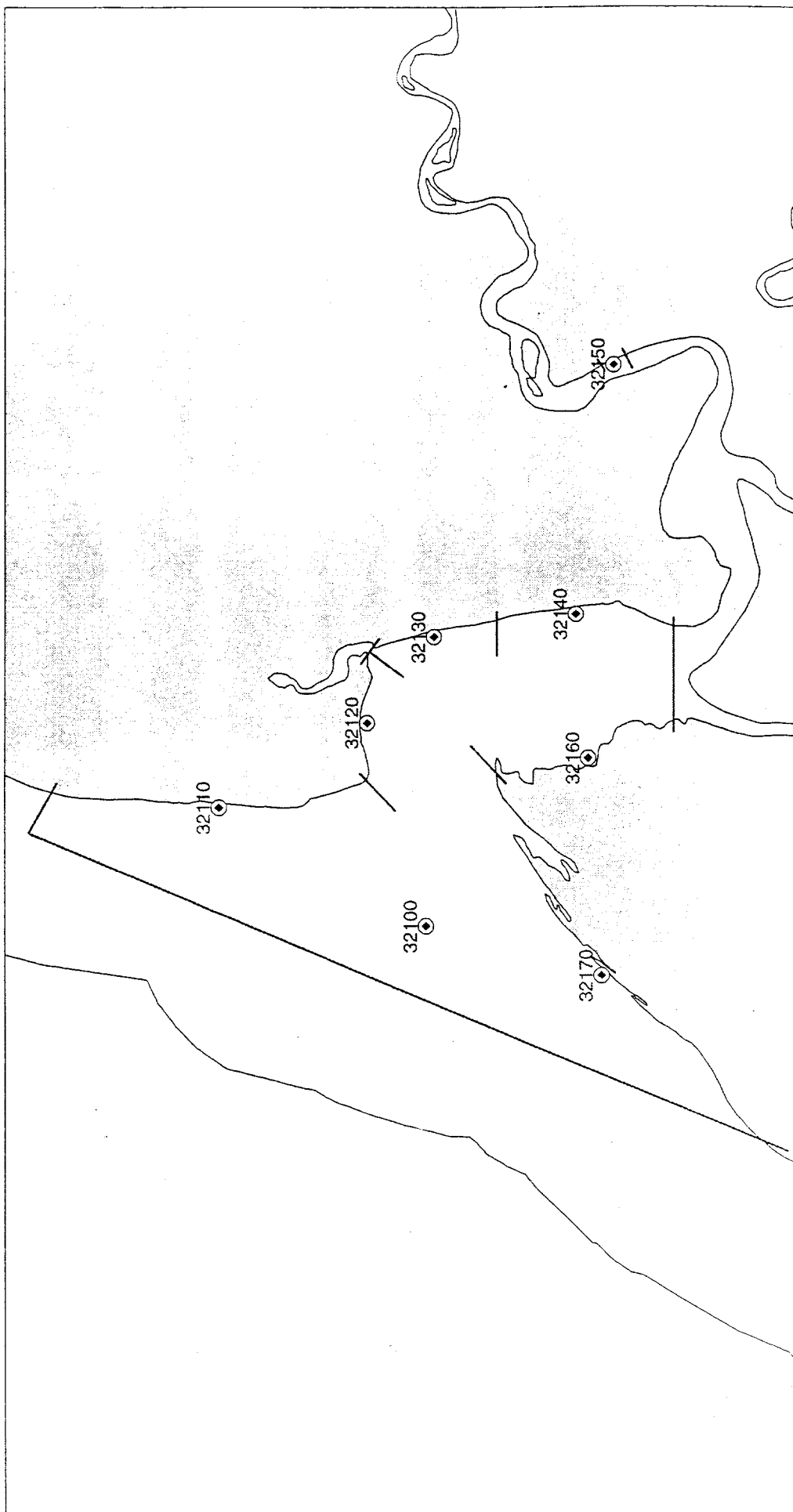


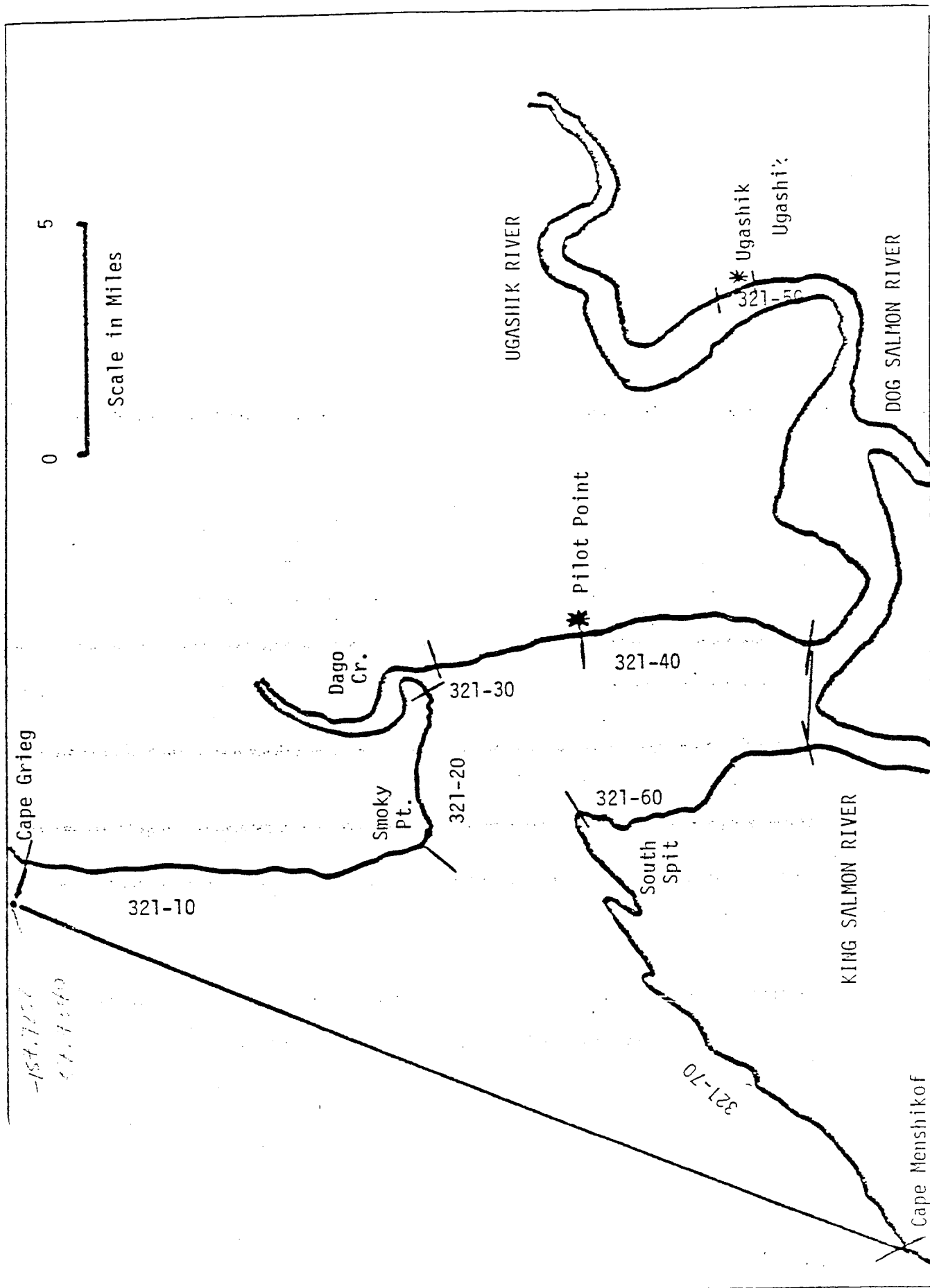




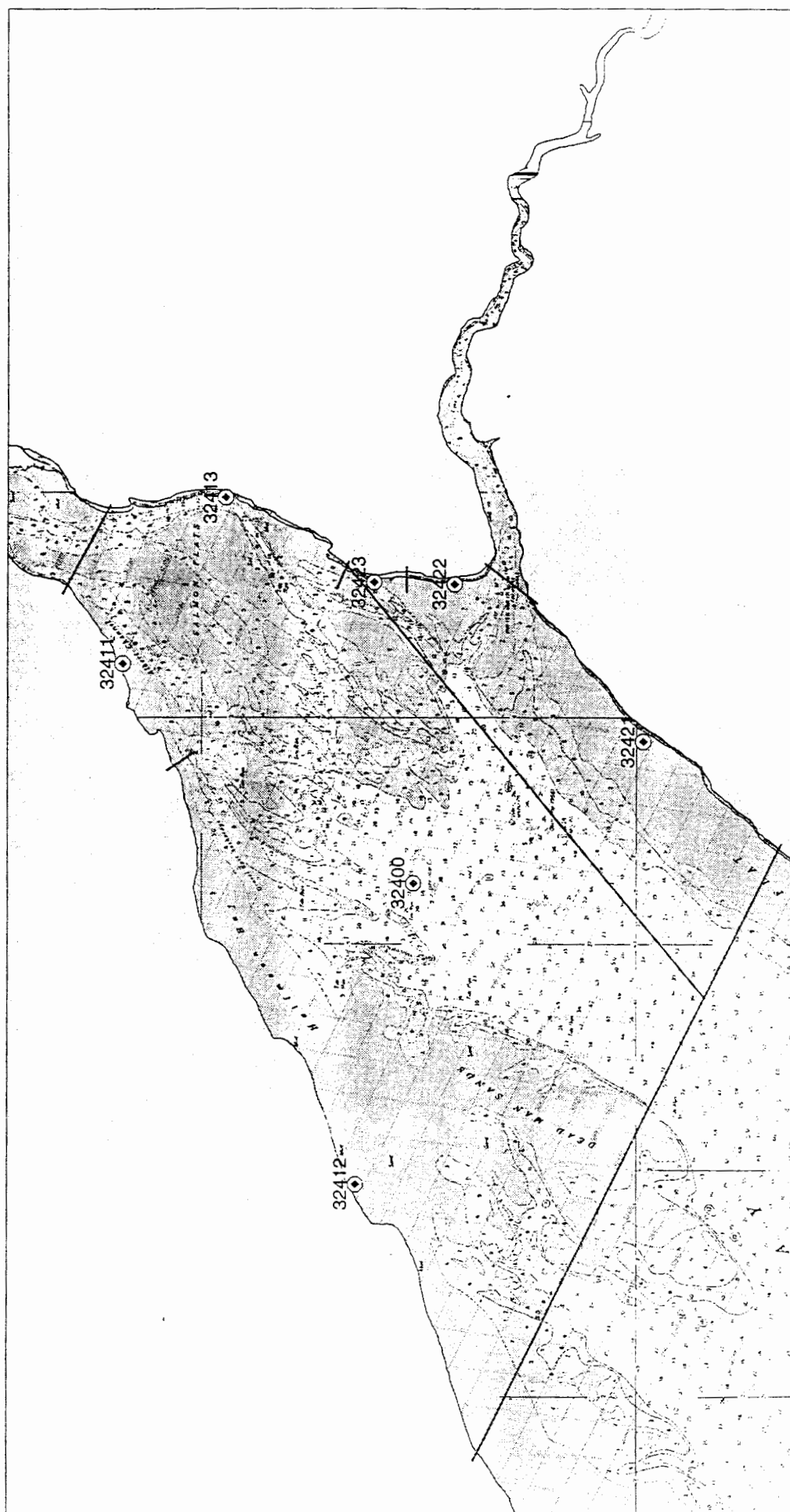
Egegik District, showing Statistical Areas for setnet beaches.

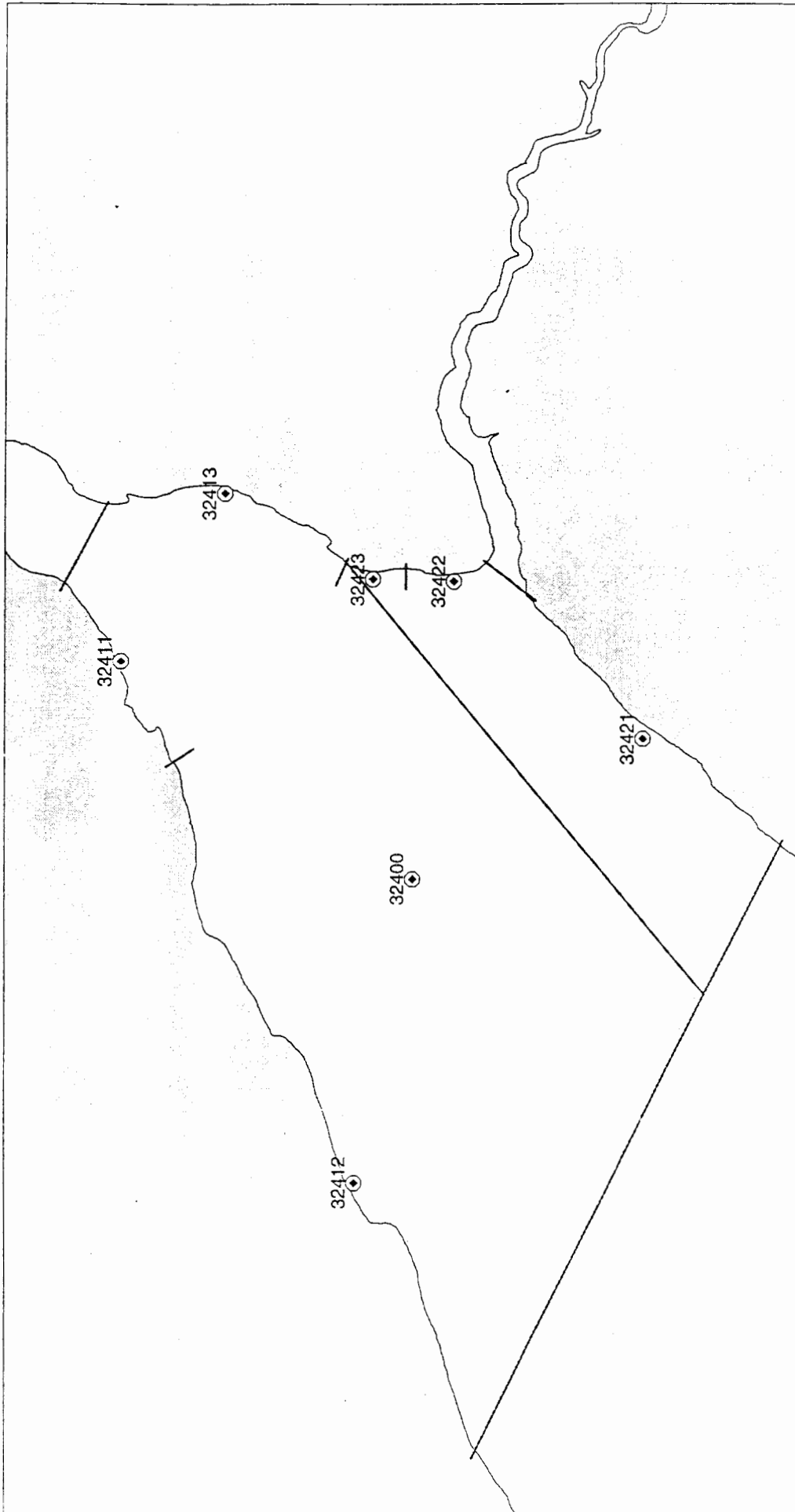






Ugashik District, 1989 showing Statistical Areas for setnet beaches.





SET NET SUBDISTRICTS

ALASKA DEPT. OF FISH & GAME

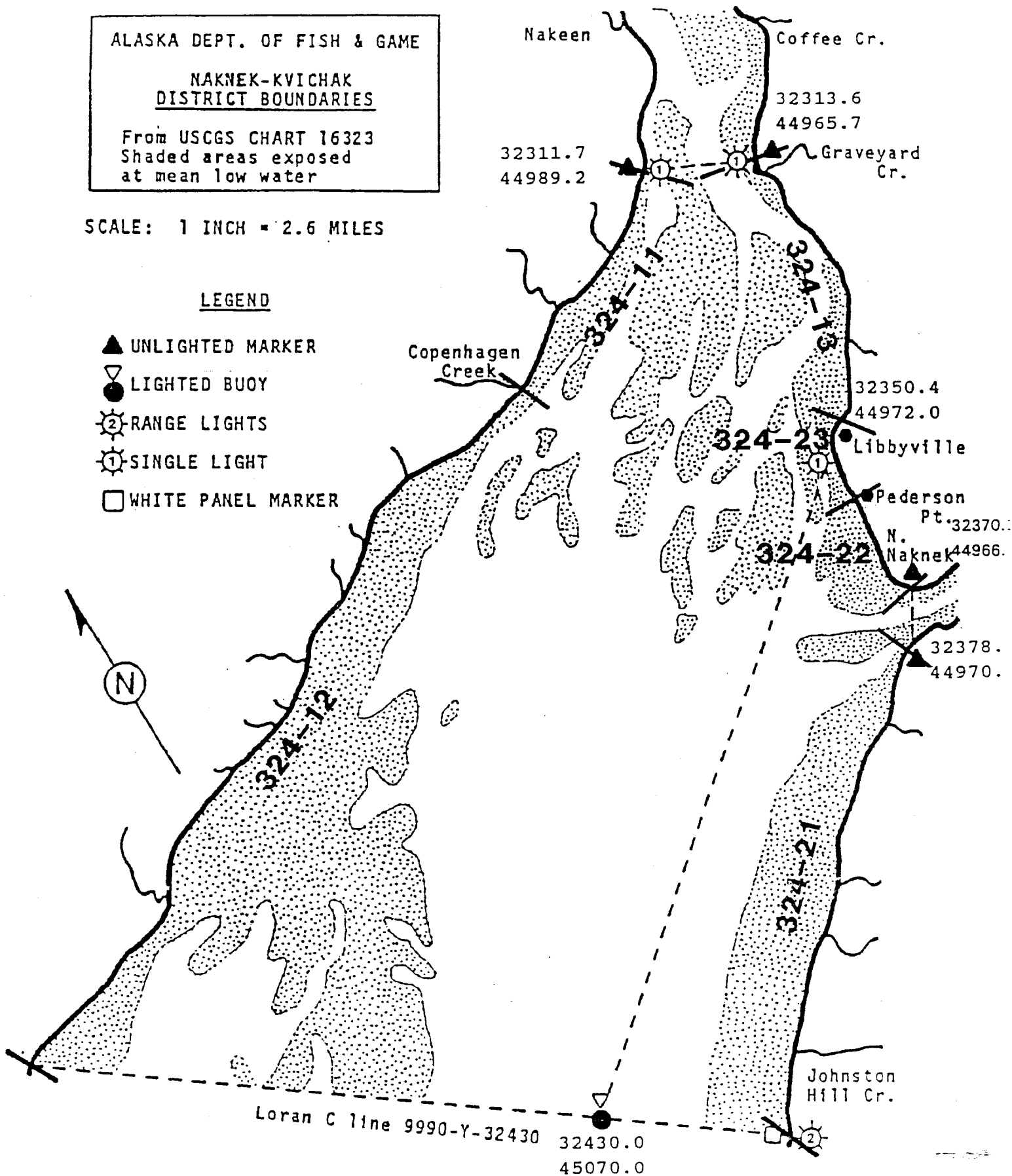
NAKNEK-KVICHAK DISTRICT BOUNDARIES

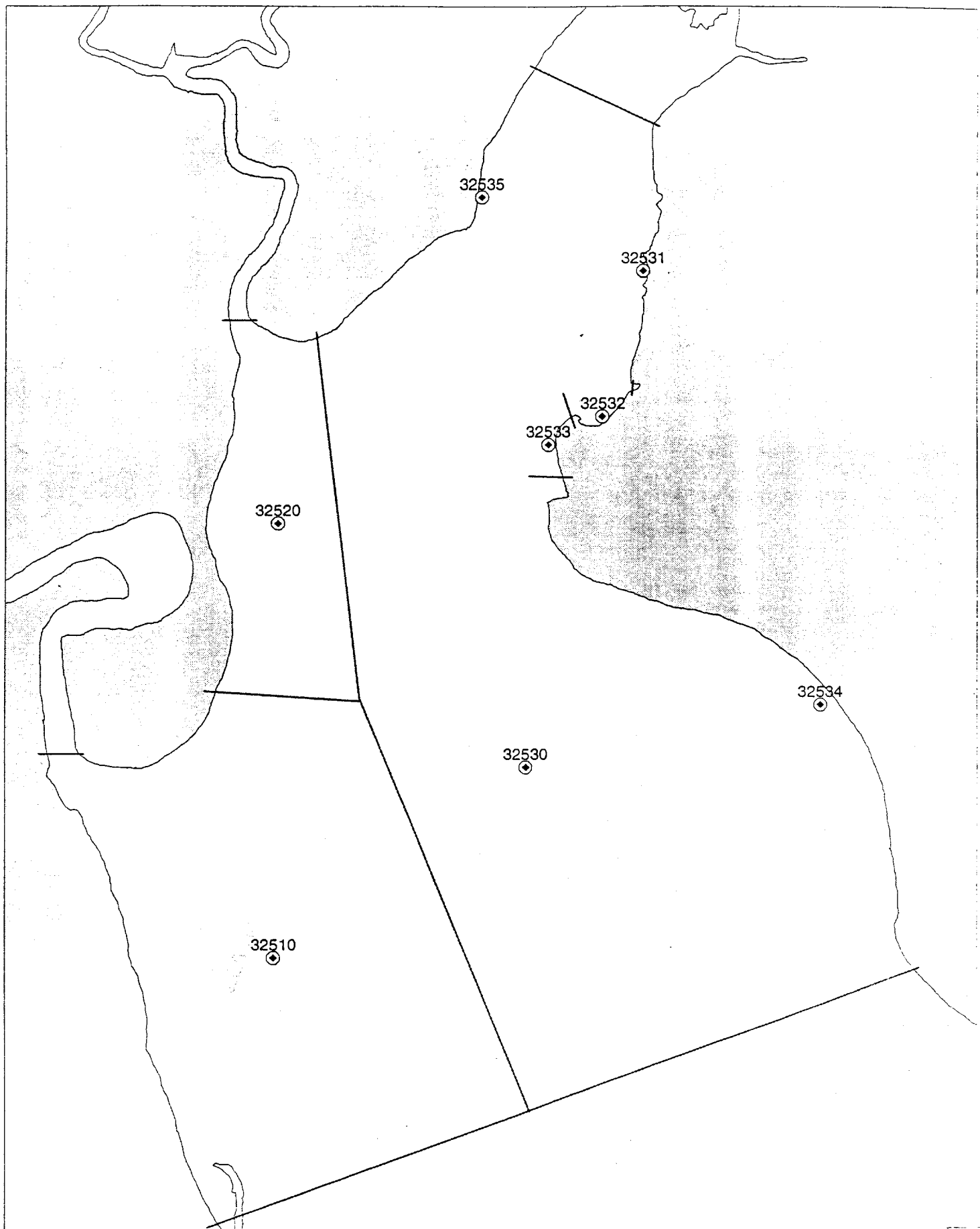
From USCGS CHART 16323
Shaded areas exposed
at mean low water

SCALE: 1 INCH = 2.6 MILES

LEGEND

- ▲ UNLIGHTED MARKER
- LIGHTED BUOY
- ② RANGE LIGHTS
- ① SINGLE LIGHT
- WHITE PANEL MARKER



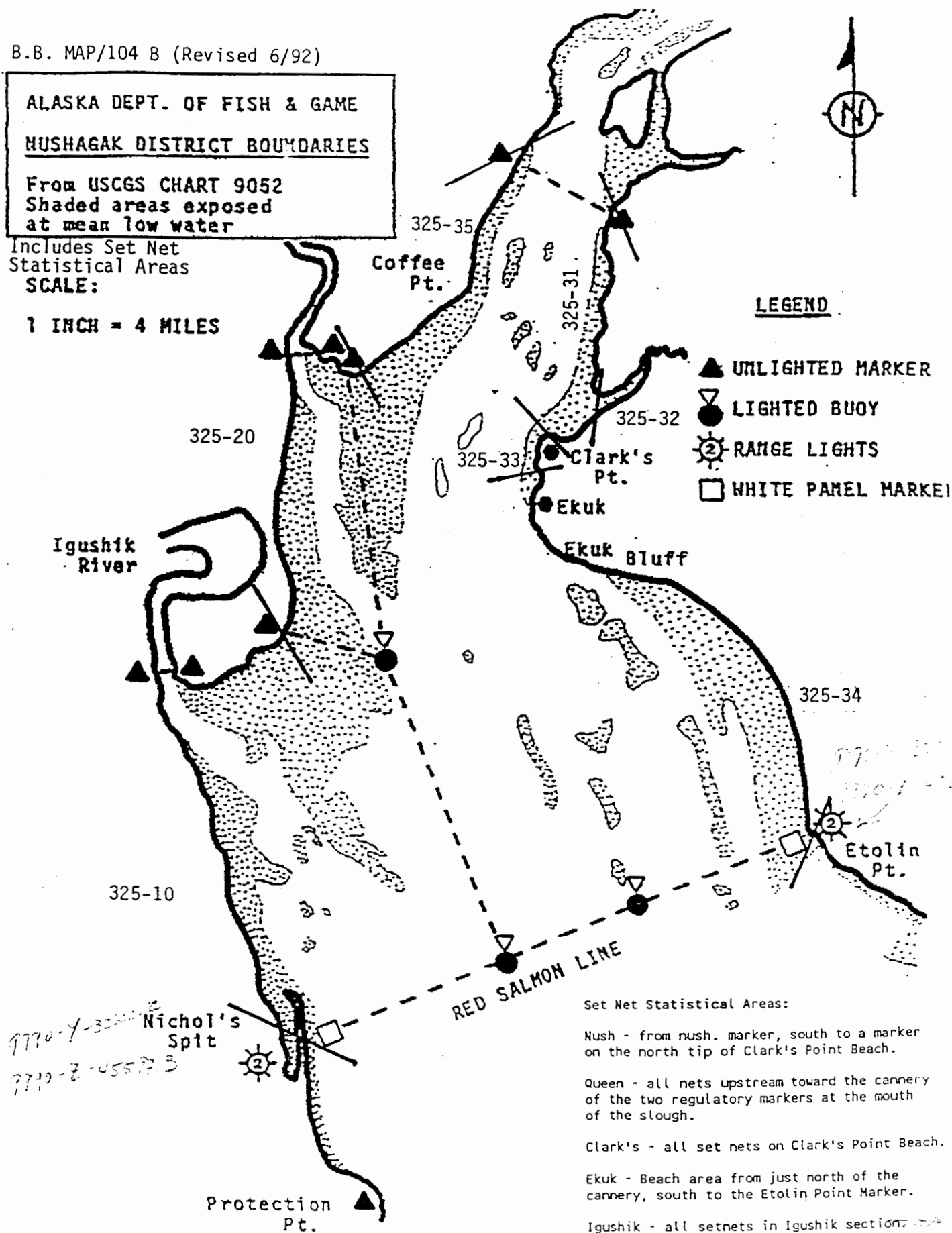


ALASKA DEPT. OF FISH & GAME
HUSHAGAK DISTRICT BOUNDARIES

From USCGS CHART 9052
Shaded areas exposed
at mean low water

Includes Set Net
Statistical Areas
SCALE:

1 INCH = 4 MILES



LEGEND

- ▲ UNLIGHTED MARKER
- LIGHTED BUOY
- ⊗ RANGE LIGHTS
- WHITE PANEL MARKER

Set Net Statistical Areas:

Nush - from nush. marker, south to a marker on the north tip of Clark's Point Beach.

Queen - all nets upstream toward the cannery of the two regulatory markers at the mouth of the slough.

Clark's - all set nets on Clark's Point Beach.

Ekuk - Beach area from just north of the cannery, south to the Etolin Point Marker.

Igushik - all setnets in Igushik section.

Coffee Point - all set nets south of Bradford Point marker, to upper Snake River marker.

Table 3. Total smolt outmigration estimates for Ugashik River by outmigration year, 1983-1991 and 1993-1996.

Year of Outmigration	Operating Dates	Total Days Operated	Cumulative Percent by Date			Peak Daily		Total Smolt Estimate
			10%	50%	90%	Date	Smolt Estimate	
1983	5/21-6/16	27	5/26	6/01	6/13	6/07	5,355,409	44,033,811
1984	5/22-6/16	26	5/24	6/01	6/08	6/01	26,771,956	158,174,626
1985	5/22-6/17	27	5/24	6/05	6/11	6/04	5,498,113	34,101,390
1986	5/21-6/13	24	5/30	6/02	6/10	5/30	9,142,549	53,076,253
1987	5/17-6/13	28	5/21	6/03	6/06	6/03	4,944,521	26,947,225
1988	5/17-6/13	28	5/28	6/06	6/10	6/07	55,816,902	215,968,015
1989	5/22-6/15	25	5/25	5/31	6/09	5/25	22,376,115	126,298,122
1990	5/20-6/13	25	5/26	5/30	6/07	5/29	13,459,723	53,627,347
1991	5/20-6/13	25	5/25	6/02	6/06	6/02	11,905,863	73,769,877
1992		0						
1993	5/17-6/11	26	5/26	5/30	6/06	5/26	12,360,357	70,747,074
1994	5/20-6/12	24	5/28	6/04	6/07	6/04	6,914,049	30,030,624
1995	5/22-6/12	22	5/24	5/26	6/01	5/25	4,355,545	22,234,137
1983-95 Avg		21	5/21	5/26	6/01	5/25	11,155,245	29,234,187
1983-95 Avg		24	5/26	6/01	6/07	6/01-02	14,908,125	55,581,762
1983-95 Avg		25	5/30	6/05	6/13	6/07	55,816,902	215,968,015
1996 ^a	5/19-6/11	26	5/26	5/30	6/04	6/04	877,053	3,381,266

^a Preliminary inseason smolt outmigration estimates.

9/25/96

Appendix 23A. Percent of total sonar counts recorded from two arrays at the sockeye salmon smolt counting site on the Ugashik River, 1983-1996.			
Percent of Total Sonar Count			
Year	Inshore Array	Offshore Array	Total Sonar Count
1983	82	18	5,500,388
1984	56	44	15,679,789
1985			
1986	40	60	4,829,091
1987	26	74	3,299,865
1988	13	87	15,349,665
1989	25	75	15,341,442
1990	30	70	7,023,316
1991	55	45	9,549,448
1992			
1993	61	39	7,397,502
1994	27	73	3,241,509
1995	17	83	3,027,734
1996	23	77	474,445
1983-96 Min	13	18	474,445
1983-96 Avg	38	62	7,559,516
1983-96 Max	82	87	15,679,789

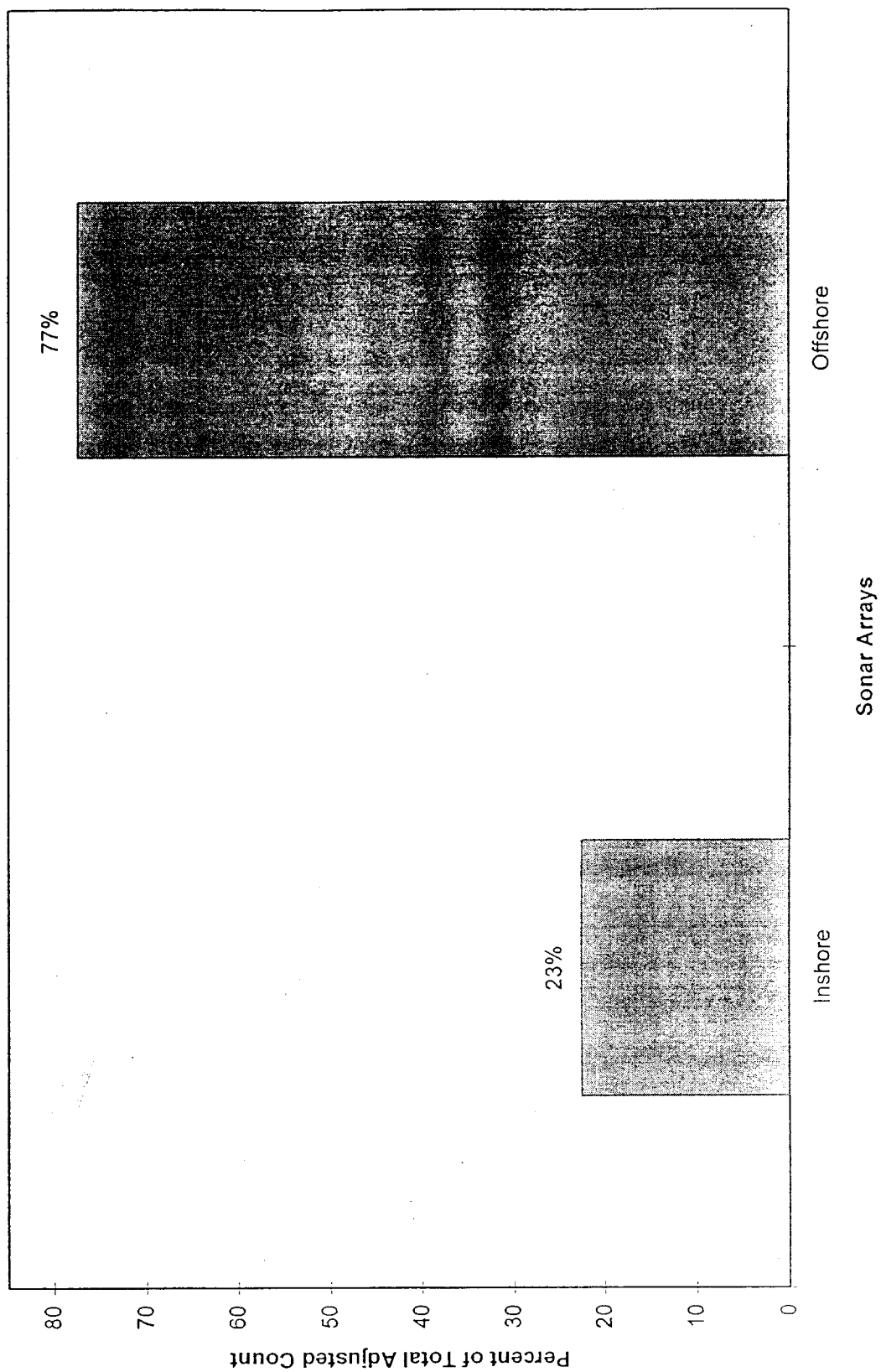
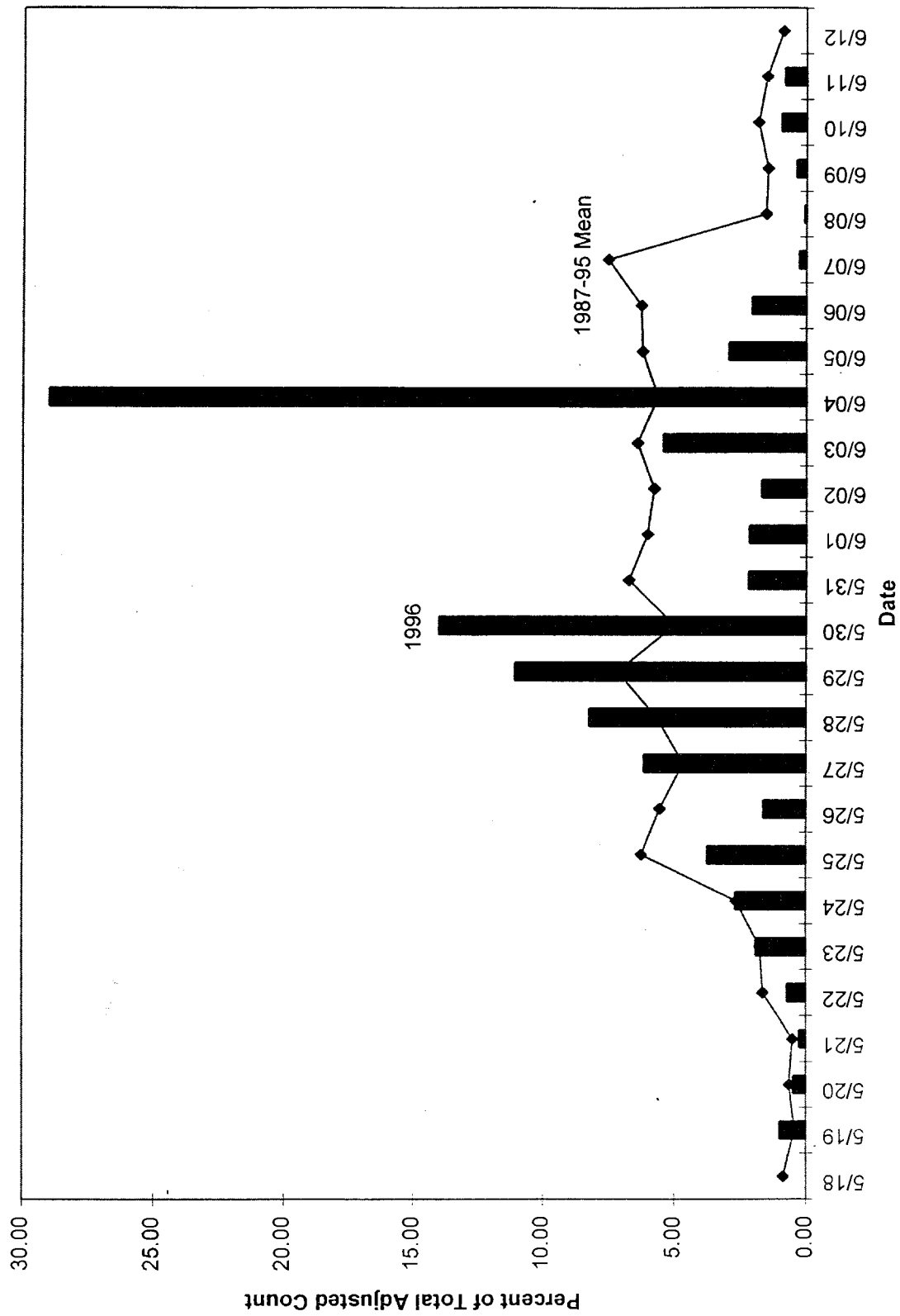
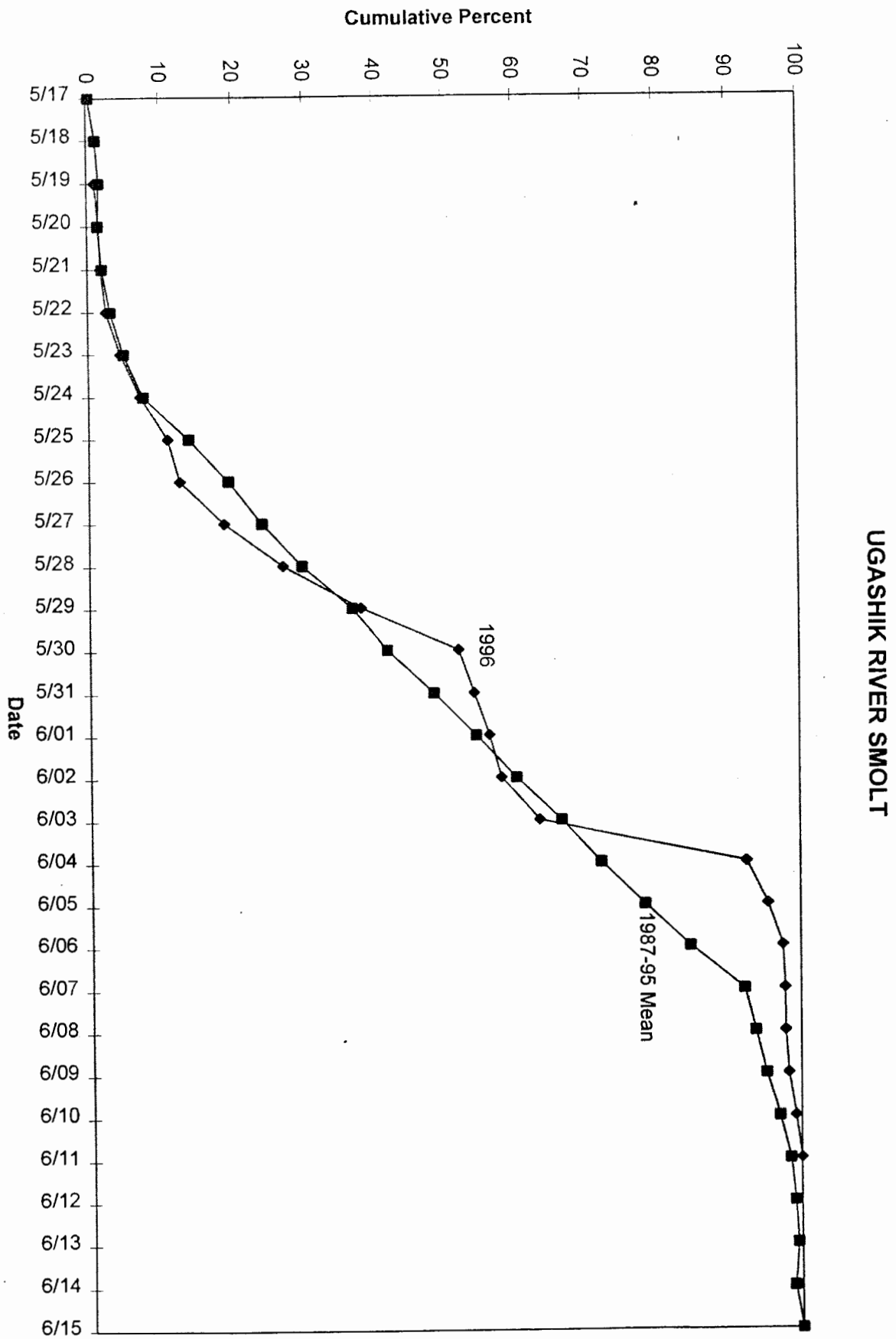


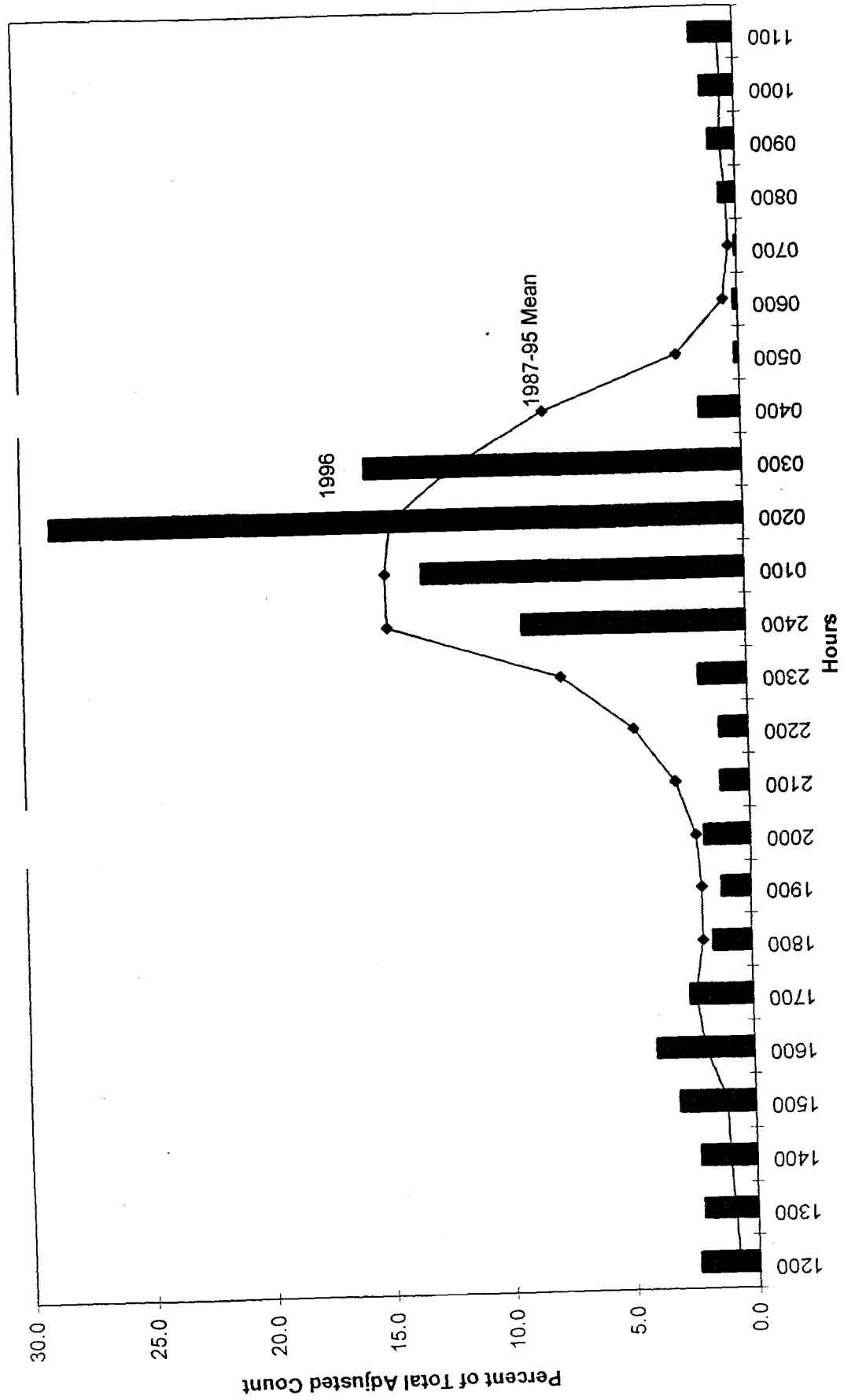
Figure 15. Lateral distribution of Ugashik River smolt sonar counts, 1996.

UGASHIK RIVER SMOLT





UGASHIK RIVER SMOLT



UGASHIK RIVER SMOLT SITE

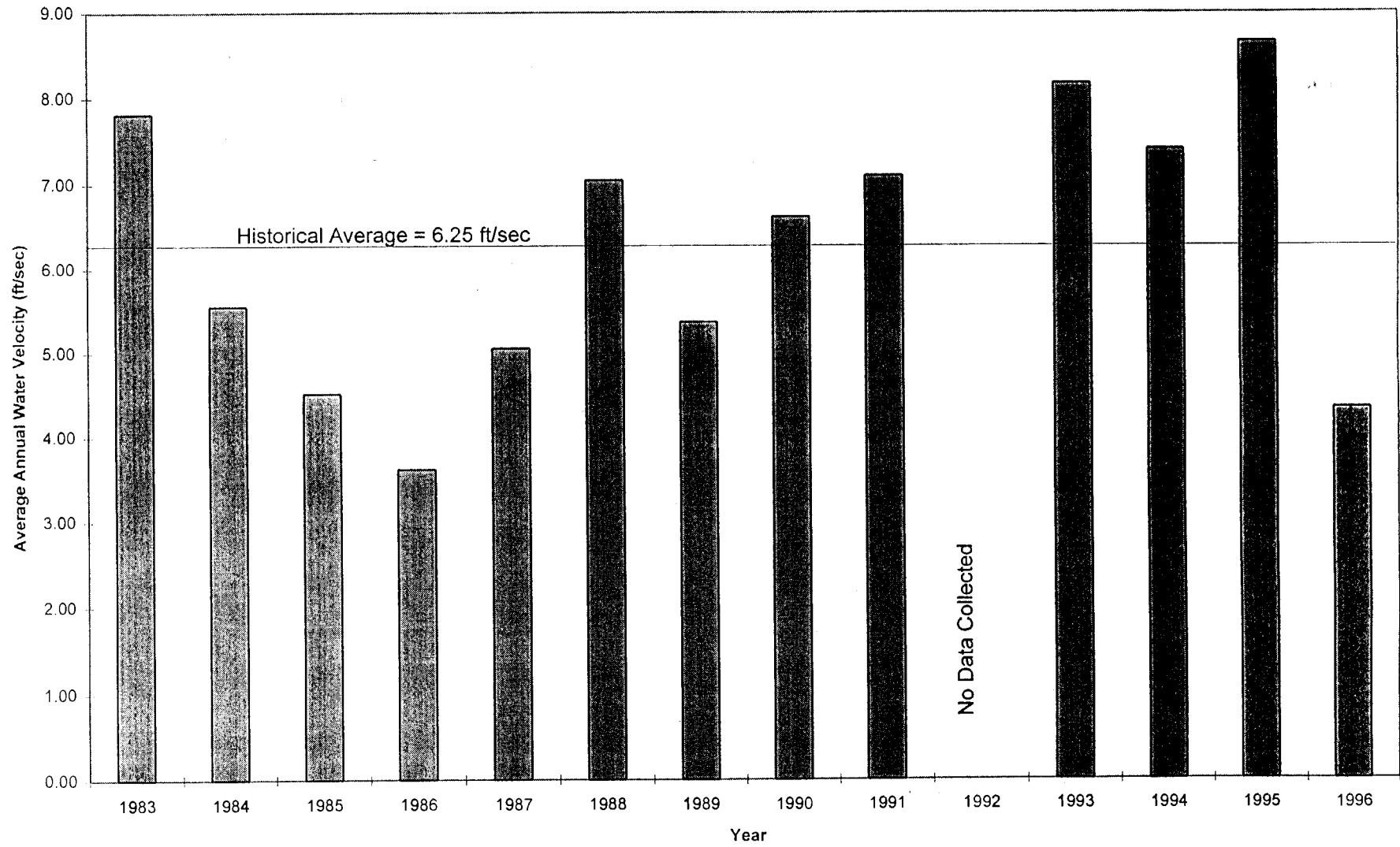


Table 28. Mean fork length and weight of sockeye salmon smolt captured in fyke nets, Ugashik River, 1996.

Smolt Day ^a	Age 1.					Age 2.				
	Mean Length (mm)	Std. Error	Mean Weight (g)	Std. Error	Sample Size	Mean Length (mm)	Std. Error	Mean Weight (g)	Std. Error	Sample Size
5/20	104	9.4	9.9	2.70	28	117	17.2	14.0	6.14	24
5/21	110	11.5	12.2	4.21	29	120	14.4	15.7	5.31	71
5/22	78	15.3	4.4	2.47	4	104		9.5		1
5/23	102	28.7	10.5	6.64	62	115	18.2	14.2	5.58	38
5/24	106	26.3	11.7	6.34	43	115	13.0	14.5	4.96	57
5/25	110	17.3	12.3	5.34	42	118	14.3	15.2	5.43	57
5/26	106	15.0	12.0	4.57	34	116	13.8	15.2	5.70	66
5/27	103	25.1	10.8	6.03	32	116	19.4	13.9	4.58	68
5/28	106	16.1	11.5	5.28	17	116	15.5	15.0	6.11	83
5/29	102	19.9	10.1	6.85	26	115	12.3	13.5	4.30	74
5/30	98	15.7	8.9	4.64	15	112	11.7	12.7	3.92	85
5/31	102	13.2	10.4	3.85	16	112	9.7	13.1	4.05	84
6/01	105	12.9	11.0	4.14	9	114	16.6	13.4	3.48	91
6/02	96	13.9	9.3	4.06	30	112	11.4	13.7	3.46	70
6/03	98	21.1	9.1	4.78	30	111	12.9	12.5	4.57	70
6/04	95	13.9	7.8	3.67	35	111	15.2	12.0	5.28	65
6/10	91	9.3	6.9	2.15	36	107	15.9	11.4	4.58	14
Total Mean	101		9.9		488	114		13.5		1,018

^a Sample day began at 1200 hours and ended at 1159 hours the next calendar day.

Table 29. Age composition of total migration and mean fork length and weight by age class for sockeye salmon smolt, Ugashik River, 1958-1996.

Year of Migration	Age 1.				Age 2.				Age 3.				Total Estimate ^a		
	Brood Year	Percent of Total Estimate	Mean Length (mm)	Mean Weight (g)	Brood Year	Percent of Total Estimate	Mean Length (mm)	Mean Weight (g)	Brood Year	Percent of Total Estimate	Mean Length (mm)	Mean Weight (g)			
1958	1956	-	93	6.4	1955	-	112	11.7	1954	-	-	-	-		
1959	1957	-	90	6.1	1956	-	120	13.5	1955	-	-	-	-		
1960	1958	-	90	6.6	1957	-	104	11.0	1956	-	-	-	-		
1961	1959	-	90	6.7	1958	-	112	12.2	1957	-	-	-	-		
1962	1960	-	88	6.1	1959	-	112	12.3	1958	-	-	-	-		
1963	1961	-	90	6.1	1960	-	104	9.6	1959	-	-	-	-		
1964	1962	-	92	6.9	1961	-	118	12.7	1960	-	-	-	-		
1965	1963	-	94	6.9	1962	-	114	12.5	1961	-	-	-	-		
1967	1965	-	88	6.0	1964	-	113	12.2	1963	-	-	-	-		
1968	1966	-	93	6.5	1965	-	113	10.7	1964	-	-	-	-		
1969	1967	-	97	7.5	1966	-	121	14.5	1965	-	-	-	-		
1970	1968	-	97	7.7	1967	-	125	15.9	1966	-	-	-	-		
1972	1970	-	81	5.0	1969	-	112	11.2	1968	-	129	14.3	-		
1973	1971	-	93	7.2	1970	-	113	11.9	1969	-	132	20.1	-		
1974	1972	-	94	7.4	1971	-	119	13.6	1970	-	-	-	-		
1975	1973	-	96	7.2	1972	-	116	13.0	1971	-	125	16.7	-		
1982	1980	-	88	6.3	1979	-	113	13.0	1978	-	138	22.5	-		
1983	1981	71	89	7.6	1980	29	111	13.2	1979	-	-	-	44,033,811		
1984	1982	48	87	6.8	1981	52	102	10.3	1980	0	103	11.7	158,174,626		
1985	1983	37	94	8.3	1982	63	107	11.8	1981	-	-	-	34,101,390		
1986	1984	71	87	5.8	1983	29	114	10.9	1982	-	-	-	53,076,253		
1987	1985	20	94	7.9	1984	80	107	11.1	1983	0	138	24.1	26,947,225		
1988	1986	85	87	5.7	1985	15	109	10.8	1984	0	128	15.6	215,968,015		
1989	1987	74	90	6.5	1986	26	108	10.7	1985	-	-	-	126,298,122		
1990	1988	28	90	6.7	1987	72	108	11.8	1986	-	-	-	53,627,347		
1991	1989	35	92	7.7	1988	65	107	11.6	1987	-	-	-	73,769,877		
1992	1990	-	-	-	1989	-	-	-	1988	-	-	-	-		
1993	1991	83	92	8.0	1990	17	109	12.5	1989	-	-	-	70,747,074		
1994	1992	81	89	6.7	1991	19	109	11.2	1990	-	-	-	30,030,624		
1995	1993	31	93	7.8	1992	69	106	11.1	1991	-	-	-	22,234,137		
Mean			88	6.6				108	11.6				128	17.9	69,923,731
1996	1994	44	101	9.9	1993	56	114	13.5	1992	-	-	-	2,576,812		
% Difference			15	50				6	16						

^a No estimates of smolt numbers from 1958-1982 fyke net catches; estimates of smolt numbers from 1983-1991 and 1993-1996 based on hydroacoustic techniques.

^b Project not operated in 1992. No smolt data collected.

Haanpaa, Dennis

From: Regnart, Jeff
To: Haanpaa, Dennis
Cc: _Dillingham Tom Brookover; _Dillingham Jim Browning; Weiland, Keith
Subject: FBII for Bristol Bay
Date: Thursday, March 14, 1996 10:07AM

Dennis, here is our attempt in laying out how the present Bristol Bay management. staff would use a "roving" FBII and the cost associated with this approach as compared to other scenerio's.

The duration of employment would be 8 man months to start in April and finish in November at a cost of \$43,076. This position would take the place of the two FBI's that King Salmon and Dillingham are planning on hiring this spring. The cost of the two 5 month FBI's will be \$74,738. If a "roving" FBII were to be hired a F&W Tech III would need to be hired in Dillingham for the day to day supervision of the West Side tower projects, this position would be 2 man months in duration at a cost of \$15,049. Total cost of the FBII-FWTECHIII package would be \$58,125 which is \$16,613 less expensive than the hiring of two FBI's.

The proposed duties of the FBII would include:

April 1 until May 15 - Based in Dillingham

- assist the public during Herring
- supervise the volunteer test fishing
- possible backup surveyor

May 16 until June 10 - Based in King Salmon

- maintain and setup office
- assist public
- buoys and markers

June 11 until June 30 - Based in Dillingham

- assist the public
- supervise subsistence chinook interviews
- assist with inseason aerial surveys
- supervise Wood and Nuyakuk Towers
- assist in supervision of district test fishing

July 1 until July 15 - Based in King Salmon

- assist the public
- participate in management meetings
- assist with inseason aerial surveys

July 16 until August 31- Split between Dillingham and King Salmon

- assist in spawning ground surveys
- assist the public
- supervise Nush/Mul escapement sampling
- assist in post season clean-up and inven.

September 1 until November 30 - Primarily based in Dillingham

- Data analysis
- assist the public
- post season duties in King Salmon
- assist in report writing

- Spawning Ground Report
- AMR tables
- Digitizing of area maps